# FOOD MANUFACTURE

*Incorporating Food Industries Weekly*

ARD HILL LIMITED, STRATFORD HOUSE, 9 EDEN STREET, LONDON, N.W.1 APRIL 1, 1954



Department Food Technology
University of Massachusetts
Amherst, Massachusetts

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## How much does a 1-inch steam trap cost Chief?

"How much does a 1-inch steam trap cost Chief?"

"*Depends on how many times you buy it, my lad.*"

"What do you mean, Chief? You only buy one trap once."

"*You're talking about how much you pay to get it in the first place, son. After that you go on paying. Paying for spares, paying for time to put 'em in, paying for lost production.*"

"Lost production, Chief? D'you mean while you're fiddling with the trap?"

"*No, my lad. Take these presses. The hotter they are, the more they produce. The better they're trapped, the hotter they are. The cheapest trap is the one that traps best and wants least fiddling.*"

"Meaning Drayton/Armstrong's, Chief?"

"*You've said it, my lad.*"

**[The Drayton book on trapping explains all this and describes the Drayton/Armstrong range. It is well worth writing for.]**

★ **THIS shows what it CAN cost!...**

"Please find attached order for D/A's. Mr. McCarrick would like 2 off No. 200 as soon as possible, by return if you can.

"Mr. McCarrick informed me that lately he opened up a number of traps, including D/A's, and got the shock of his life. The two D/A's were OK. He cleaned and replaced. Every other trap was badly defective. In some cases the whole of innards were missing. As he has recently taken over the engineer's post here he has no idea of the age of the traps. Luckily he had some spare D/A's available which he fitted temporarily. He now intends to go over his whole plant and get it into 100% D/A."

(The original letter can be inspected)

# Drayton Traps are better traps

for ● HIGHER production ● LOWER maintenance ● FUEL SAVING

DRAYTON REGULATOR & INSTRUMENT CO., LTD., WEST DRAYTON, MIDDLESEX (West Drayton 2611)

DA 36

# Anywhere anytime

## THEY'RE SAFE IN —

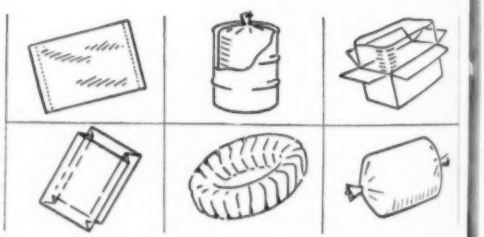
# 'FABLOTHENE'

Regd. Trade Name

**THE TRANSPARENT PACKING WITH A LASTING FUTURE**

'FABLOTHENE', the new Polythene Layflat tubing, protects and preserves what it shows — simply, attractively, and more efficiently. Inert, stable, tough and flexible, 'FABLOTHENE' keeps in and keeps out moisture, excludes contamination and seals in freshness in Tropic heat or Arctic cold, through corrosive sea air or penetrating dust.

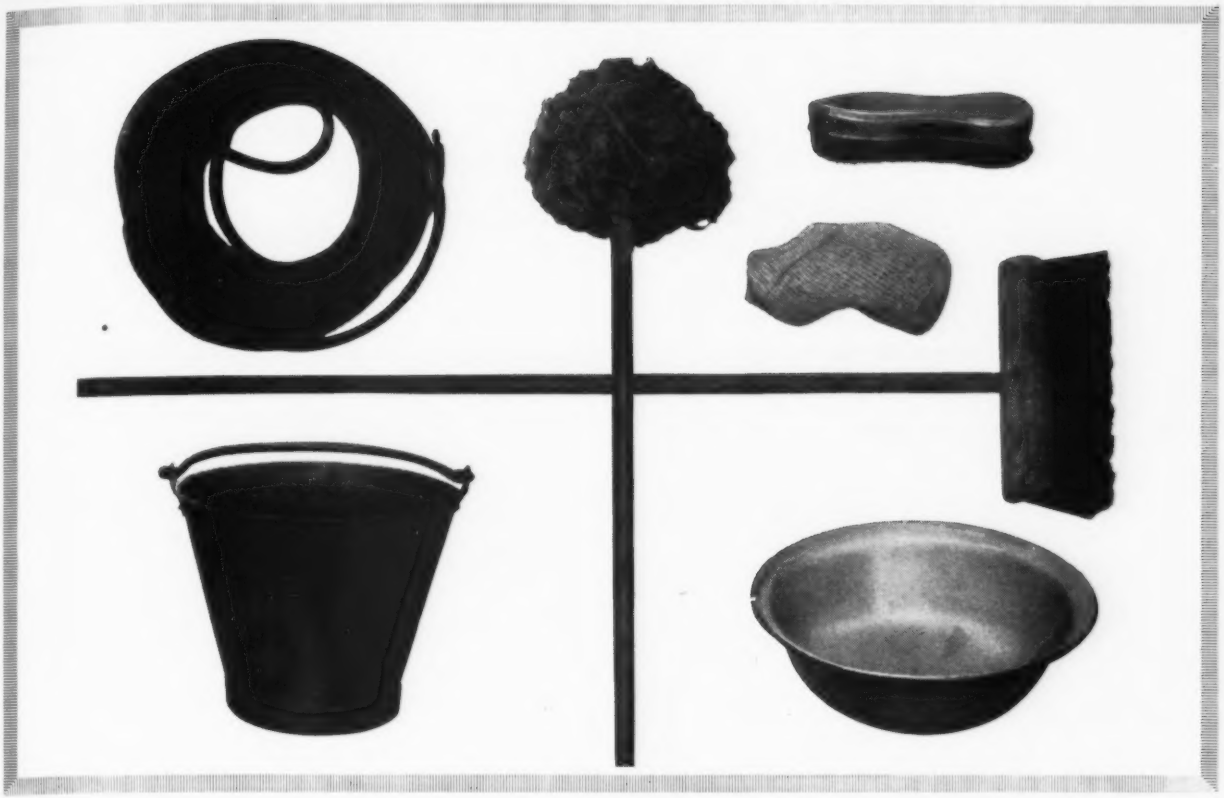
'FABLOTHENE' is available in tube widths of 2" up to 30" and thicknesses from .0015" to .005". As shown here it can be readily sealed into bags or envelopes or made up as drum or case linings.



** Write for descriptive leaflet and samples*

"Fablothene" layflat Polythene Tube

ANGLO-AMERICAN PLASTICS LIMITED, 1 AVERY ROW, GROSVENOR STREET, LONDON, W1 · HYDE PARK 9201

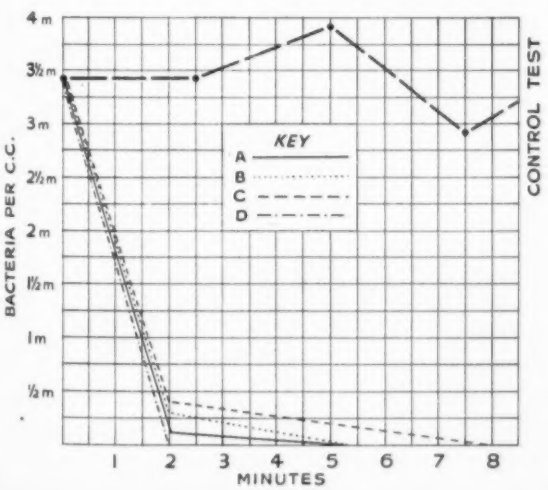


# Which one of these do you use?

It doesn't really matter as long as you are using Marinol-D; scrubbing, rinsing, soaking or spraying, the detergency and germicidal potency of Marinol-D will give the highest possible standard of cleanliness, both visually and microscopic.

Practical experience, following laboratory trials, has shown that complete sterility can be obtained when equipment, utensils, tools and work areas are washed with Marinol-D. In a few minutes virtually all heavy contamination of micro-organisms can be completely eliminated; even with an excess of organic solids present, such as dried milk, egg, fats, peptone and glucose, the remarkable powers of Marinol-D are exerted to their full extent.

The graph and table, giving results under practical conditions, diagrammatically illustrates the degree of safety and freedom from germs that can result from using Marinol-D when examined in the presence of dirty water, such as is found in the dish-washing tanks of industrial canteens.




| ORGANISM | | Viable Organisms per Ml. After | | |
|---|---|---|---|---|
| | | 2½ mins. | 5 mins. | 7½ mins. |
| Escherichia Coli | (A) | 20 | Nil | Nil |
| Staphylococcus Aureus | (B) | 70 | Nil | Nil |
| Proteus Mirabilis | (C) | 1,200 | 900 | 50 |
| Penicillium Expansum Spores | (D) | Nil | Nil | Nil |
| Control Test (Without Adding Marinol-D) | | 3,480,000 | 3,960,000 | 2,900,000 |

Temperature – 50°C. to 45°C. pH of Solution – 8.5

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TRADE MARK

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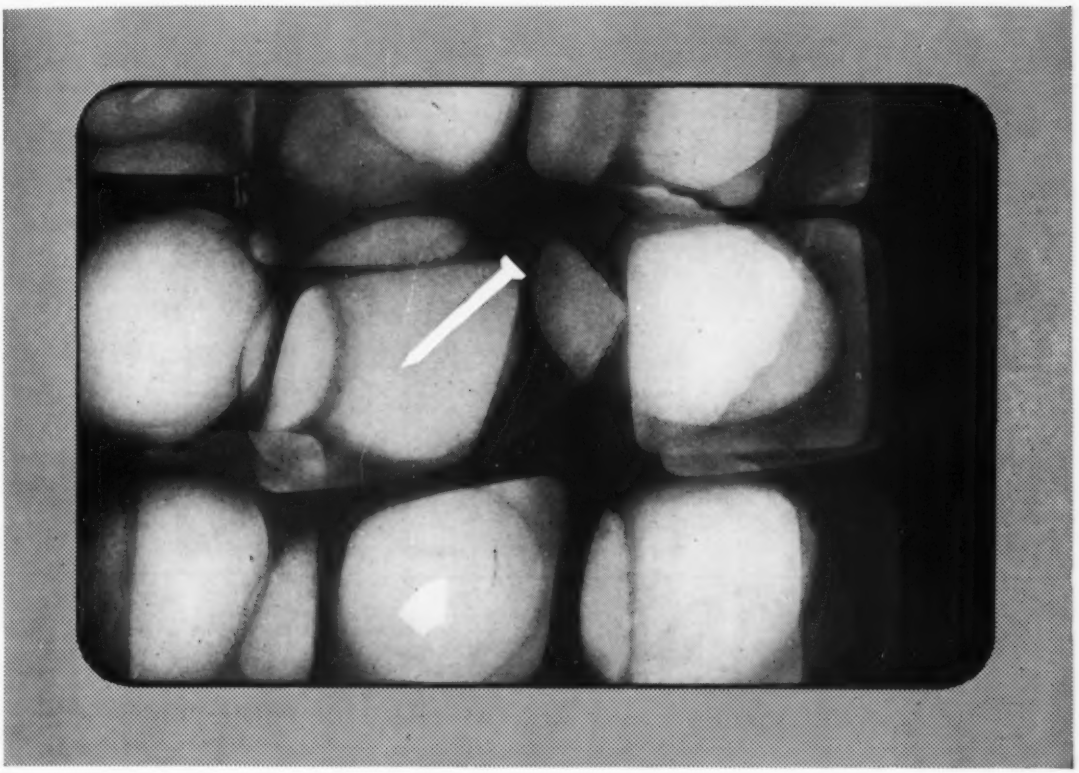

*What the unskilled operator saw . . .*
*. . . and the customer never received*

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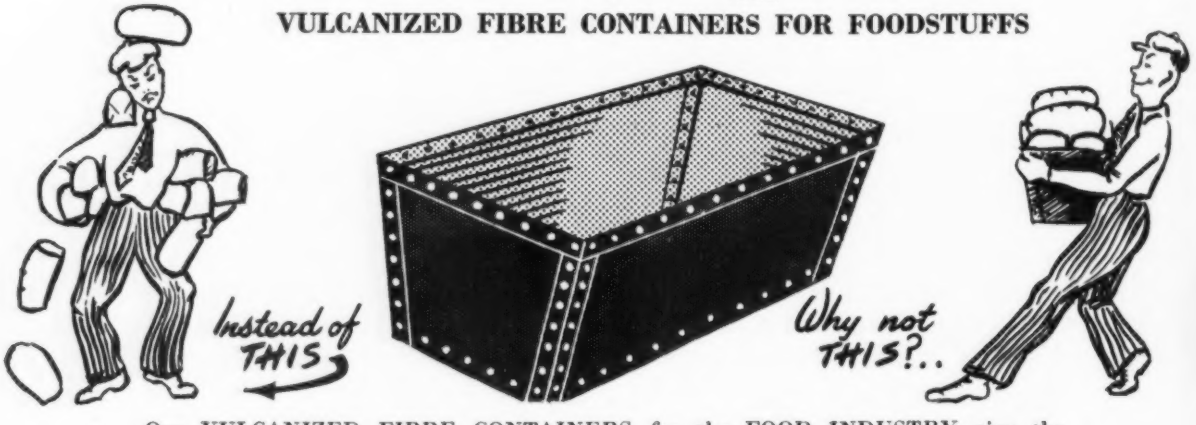
REGD.

**VULCANIZED FIBRE CONTAINERS FOR FOODSTUFFS**




Our VULCANIZED FIBRE CONTAINERS for the FOOD INDUSTRY give the maximum protection to foodstuffs, with a minimum of weight and cost. These containers are strong, light and clean. They do not splinter or rust, and cannot contaminate your goods, nor do they have projections to tear wrappings. They can be handled easily and quickly, possessing the maximum carrying-capacity for a given weight. They stack conveniently and firmly.

*We shall be pleased to quote against all enquiries for containers of any size or shape, for carrying anything, and our Technical Department is at your disposal to help in designing containers for special requirements.*

**ANGLO-AMERICAN VULCANIZED FIBRE CO. LTD.**

CAYTON WORKS, BATH STREET, LONDON, E.C.1

**Phone: CLE 3271**

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*COMPETITIVE PRICES*

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**In addition we distribute a wide range of general equipment for the Chemical, Food and allied Industries.**

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*If you have to*

# GRIND IT, SIFT IT,

# MIX IT *or* DRY IT

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SEE OUR EXHIBIT

**STAND No. D228**

**GARDNERS PROCESSING PLANT IS USED IN THE MANUFACTURE OF:**

SELF RAISING FLOUR · BAKING POWDER · CUSTARD POWDER SUGARS · CAKE POWDER · ICE CREAM POWDERS · CREAMS OILS · THIN PASTES · INFANT FOODS, etc., as well as a wide range of toilet and chemical products.

It might be a standard Gardner grinder, mixer, sifter or dryer. You have Britain's widest range of machines to choose from. Or it might need some special features to suit your process. It might even have to be a special job entirely. But you'll get the right machine from Gardners of Gloucester. Send in sample materials for a confidential test report and recommendations on the right machine for the job. It's the *quickest*, surest way to solve a processing problem.

*TALK TO*

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# This is pure enjoyment..

Here is a kiddy who knows what's good for her. And Wall's know how to keep it good, for millions of the "Fruties" they sell each week are protected by glassine bags—one of the products of the Bowater Packaging Division. Glassine keeps them snowy-fresh and free from contamination; another example of how Bowaters help food manufacturers to keep the good things in and the bad things out.

# Bowaters

BOWATERS SALES COMPANY LIMITED (PACKAGING DIVISION)
Bowater House, Stratton Street, London, W.1. Telephone: Grosvenor 4161

*Rover Car Factory, Solihull. High intensity lighting in a body spray tunnel by fluorescent lamps in a glazed enclosure.*

# Tailored for the job

The lighting of many processes is vital to the smooth and rapid flow of work and to the quality of the finished product. For example, poor lighting could make a spray tunnel into a bottle-neck — each job taking a little too long, a little portion missed, a return to the spray line — and so the whole production line marks time. Whatever form it takes, good lighting not only helps to provide a satisfactory working environment but is an active production tool.

Fluorescent lighting is as good as daylight — only more consistent. It is efficient; it is economical; and it is *flexible*. You can ' tailor ' it, easily and exactly, to the special requirements of production at all stages.

**HOW TO GET MORE INFORMATION**

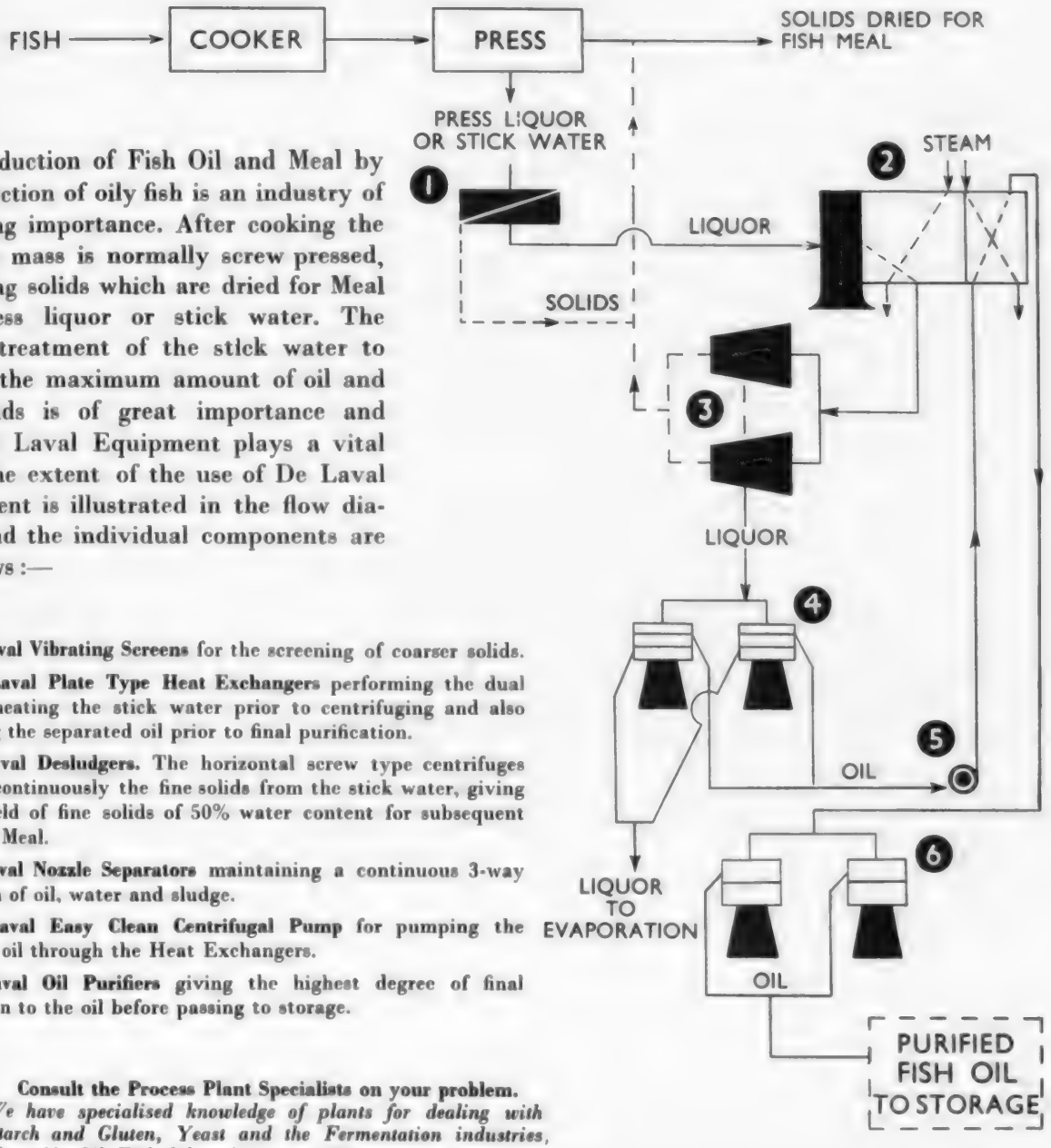
**Your Electricity Board will be glad to advise you on how to use electricity to greater advantage — to save time, money, and materials. The new Electricity and Productivity series of books includes one on lighting — " Lighting in Industry ". Copies can be obtained, price 9/- post free, from E.D.A., 2 Savoy Hill, London, W.C.2, or from your Area Electricity Board.**

**Electricity *for* PRODUCTIVITY**

*Issued by the British Electrical Development Association*

# DE LAVAL EQUIPMENT

## *in the* FISH OIL & MEAL INDUSTRY




The production of Fish Oil and Meal by the reduction of oily fish is an industry of increasing importance. After cooking the fish, the mass is normally screw pressed, producing solids which are dried for Meal and press liquor or stick water. The correct treatment of the stick water to recover the maximum amount of oil and fine solids is of great importance and here De Laval Equipment plays a vital part. The extent of the use of De Laval Equipment is illustrated in the flow diagram and the individual components are as follows :—

1. **De Laval Vibrating Screens** for the screening of coarser solids.
2. **Alfa-Laval Plate Type Heat Exchangers** performing the dual duty of heating the stick water prior to centrifuging and also re-heating the separated oil prior to final purification.
3. **De Laval Desludgers.** The horizontal screw type centrifuges separate continuously the fine solids from the stick water, giving a high yield of fine solids of 50% water content for subsequent drying to Meal.
4. **De Laval Nozzle Separators** maintaining a continuous 3-way separation of oil, water and sludge.
5. **Alfa-Laval Easy Clean Centrifugal Pump** for pumping the separated oil through the Heat Exchangers.
6. **De Laval Oil Purifiers** giving the highest degree of final purification to the oil before passing to storage.

**Consult the Process Plant Specialists on your problem.**
*We have specialised knowledge of plants for dealing with Starch and Gluten, Yeast and the Fermentation industries, Vegetable Oil, Fish Oil and Mineral Oil refining etc.*

**PROCESS ENGINEERING DIVISION**

**ALFA-LAVAL CO. LTD.**
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Smee's DL 281

*The Modern Method of FOOD PROTECTION....*

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# PRESERVEX M.U. LACQUER

*The Lacquer with*
*FOUR GREAT POINTS IN PERFORMANCE*

1. The only satisfactory Universal Canning Lacquer on the British Market
2. Resistance, both chemical and mechanical of outstanding merit for food packaging
3. Less critical of variations in application
4. Unusually high performance on aluminium

COATES BROTHERS INKS LTD., and F. J. BALLARD & Co. Ltd.
the well known manufacturers of stoving ovens have formed an association to market the latest development in tinplate printing ovens

**COATES-BALLARD RAPID HEAT TRANSFER OVEN**

The supply of special tinplate printing inks, also coatings and lacquers for use in conjunction with these ovens will be undertaken by:—

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COATES OF INDIA LTD., 3/1 Canal East Road, Ultadanga, Maniktolla, Calcutta, India

COATES BROTHERS IN N.Z. LTD., 22 England Street, Ponsonby, Auckland, New Zealand

# Do you pack any of these?

Plums, carrots, gooseberries, new potatoes, strawberries, parsnips, grapes, damsons, small beets, tomatoes, raspberries, onions, small pears, loganberries, brussels sprouts, cherries, small apples, cultivated blackberries, flower bulbs, cultivated mushrooms.

## Would they sell better graded?

## the MATHER & PLATT GROVESEND GRADER

ACCURATE. GENTLE
ECONOMICAL AND FAST

It is a small machine with a large output that can be used all the year round

*Easy to operate*
*Easy to clean*
*Easy to adjust*

Grading range: dia ⅜"-1¼" plus oversize. Output: 2-5 tons per hour

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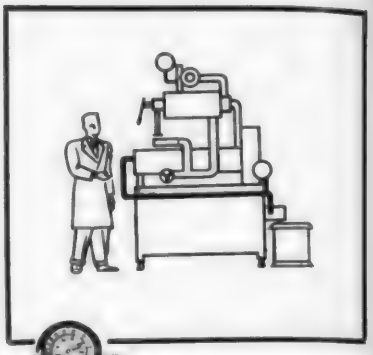
REDUCE PROCESSING COST · ENSURE UNIFORM COLOUR AND SMOOTH, CREAMY FINISH with the

# Votator

## VEGETABLE SHORTENING OR COMPOUND LARD Manufacturing Apparatus



MODEL S51A

made by

Johnson's

under licence from the Girdler Company, U.S.A.

★ *Leaflet giving full technical details on request. Technical representatives are always available for consultation and and advice.*

It is over 20 years since the Girdler Company made the first Votator and there are now more than 1,000 Units in operation in many parts of the world. The rich fund of experience which has been accumulated by Girdler's Scientists and Engineers is at the disposal of Johnson's customers.

A Votator is therefore not an experimental machine, but a well tried-out Unit which can be relied upon to do it's job from the minute it is put in operation. In addition to Votator Units for the edible fats industry our programme also comprises Units for marshmallow, salad cream, starch jellies and many other purposes.

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## your customer...

## or you?

**Metal in Food**

**HEAVY FINES IMPOSED**

A bakery firm [illegible] answered two summonses at [illegible] Magistrates' Court yesterday, for selling food unfit for human consumption. It was alleged that part of a razor blade was found in a bun, and a piece of metal in a loaf of bread.

Cintel Electronic Metal Detectors will find any type of metal and automatically eject the product containing it, without production "hold ups". What is more, customer goodwill is assured. Full details available by return on request.

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## *Progress Report*

March 31st marks the passage of yet another successful year in COLT'S history of service to Industry.

During the year, 2,164 COLT Ventilation installations have been completed, ranging from giant industrial projects to quite small improvements to existing factories. COLT equipment was particularly chosen for the latter as it can be installed without structural alterations or interference with production.

The most notable contracts included ventilation for new Power Stations at home and overseas; large industrial development schemes, including four of the New Towns; Ministry of Supply Factories and 372 new factories where COLT equipment was specified by Architects and Consulting Engineers. Among these contracts are many that have been in the news as particular examples of British enterprise.

In the domestic field, COLT'S solved the problem of condensation in the attics of prefabricated aluminium houses and their recommendations and the equipment they designed especially for this purpose have been adopted by Authorities throughout the country.

COLT technical Staff carried out 2,800 detailed surveys during the year and their services are available free and without obligation to all who have a ventilation problem.

**COLT VENTILATION LTD · SURBITON · SURREY · Tel: Elmbridge 6511-5**

*Braby trays are also used for Confectionery, Fish and other foods. We welcome your enquiries*

# Perfect cleanliness with Braby aluminium trays

Every morsel of meat stays clean and fresh in Braby aluminium alloy trays. The special alloy used will not corrode, the one-piece pressed-out design ensures perfect and immediate sterilization. Braby trays are light, easy to handle and stack safely. They are supplied with or without ventilating louvres and in two sizes 20″ × 15″ × 6″ deep, capacity 1660 cubic inches and 18″ × 13″ × 5″ deep, capacity 1000 cubic inches.

ONE OF THE WIDE RANGE OF

**BRABY**

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266-32

# Half of a horse in a panto

Curtain up, curtain down. In the old days they had to rely upon a complicated system of pulleys, winches and men with brawny muscles and sweaty brows. Today, half a horse and a little electric current does the job for them—and, as often as not, the half horse-power is supplied by a Crompton Parkinson fractional motor. In point of fact, C.P. fractional motors are efficiently helping to raise the curtain on a lot of modern improvements in a varied number of theatres.

**When it comes to FRACTIONAL H.P. MOTORS . . . you've got to hand it to Crompton Parkinson LIMITED**

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## FOR FOODSTUFFS

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WE GUARANTEE THAT THE CONTENTS OF THIS PACKAGE, IF RECEIVED INTACT AND WITH OUR SEAL UNBROKEN, COMPLY WITH THE FOOD AND DRUGS ACT AND ALL OTHER STATUTORY REQUIREMENTS OR REGULATIONS IN FORCE IN GREAT BRITAIN RELATING TO THE SALE OF EDIBLE PRODUCTS.

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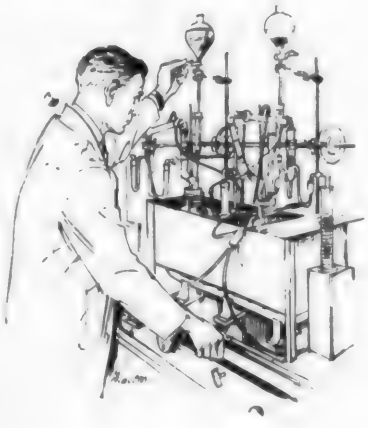
### PURITY

Modern plant and the greatest care in production ensure that 'Edicol' Supra Colours are absolutely pure. These colours enable manufacturers to achieve in their products the standard of purity demanded by the most exacting authorities in the world.

### CONTROL

'Edicol' Supra Colours are manufactured under strict laboratory control at every stage. Manufacturers exporting to the U.S.A. will be particularly interested to note that 'certified' supplies of many of the colours (F.D. & C.) are available.



*For further information please apply to:*

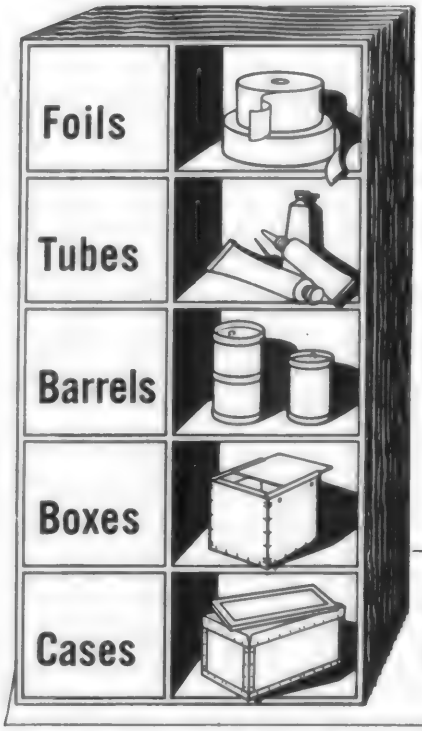
**IMPERIAL CHEMICAL INDUSTRIES LIMITED, LONDON, S.W.1**

D.369

there's more to it than

# COLLAPSIBLE TUBES

. . . or Aluminium Foil or Barrels or Boxes and Cases. We make them all, in a wide variety and for a great many different purposes, and we have had years of experience in adapting our kinds of packaging to other people's specialised requirements. All this experience, not just of manufacture but of a wide range of applications, has been integrated into a single co-ordinated service for the solution of each new packaging problem as it comes along. Not that many problems are completely new to us by this time; if *yours* is, the Venesta Packaging Division will be all the more interested to hear about it. Why not write or ring?




VENESTA

*ALL PRODUCTS OF THE*

**VENESTA PACKAGING DIVISION**

**VENESTA LIMITED, Vintry House, Queen Street Place, London, E.C.4. Telephone: CENtral 3060**
T.A. 467

# Have *YOU* tried ....

# LEINER'S

# SUNSHINE GELATINE?

As a result of extensive scientific research P. Leiner & Sons Ltd. have perfected an entirely new ice cream gelatine stabiliser. Now in large-scale production in Leiner's modern factory at Treforest, this represents an important step forward in the history of edible gelatine manufacture.

No ice cream manufacturer should lose the opportunity of trying Leiner's new Sunshine Gelatine Stabiliser or of benefitting from the improved results it gives when incorporated into an ice cream mix. Study the following facts about this new material:—

- **Dissolves with the minimum trouble**
- **Ensures even dispersion of ingredients**
- **Produces smooth even texture**
- **Prevents roughness and crystal formation**
- **Gives good overrun to the mix**
- **Promotes resistance to heat shock**
- **Prevents shrinkage in the finished product**

**Sunshine gelatine *is so economical* that only ¾ of the customary gelatine is required to produce a perfect ice cream**

*Ask for* **FREE** *sample*

Samples and technical advice on request

Should also be tried for ice lollies

Every batch subjected to rigid chemical and bacteriological control to ensure absolute purity

## P. LEINER & SONS LTD.

*Manufacturers of Gelatine for over a Century*

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WE DESIGNED THIS NEW FOLDING BOX TO SAVE YOU STORAGE SPACE IN YOUR FACTORY- AND YOUR VANS.
AS LIGHT AS A FEATHER
AS SOUND AS A BELL
LET THE PHŒNIX PHIXIES PHIX YOU UP IN LIGHT, BRIGHT ALUMINIUM
AS FLAT AS A PANCAKE WHEN FOLDED AS WELL

**"EMPTIES" no longer litter the active scene in gaping idleness. Their job done, they open out for rapid cleaning—then fold flat for space saving storage.**

**In your factory—in your customers' shops—in your collection vans, these new PHŒNIX F.B.2. Folding Boxes, give you strong, hygienic, lidded containers when in use and when folded they stack in a tenth of their own space. Assembly is a matter of seconds—by the turning of two lever locks.**

***Write for details, stating if possible your proposed use for the Phœnix Folding Box***

**Precision manufactured in lasting aluminium the Phœnix Folding Box can be embossed during manufacture with the owners' name. Made to order in the following sizes when assembled.**

***from* 15" × 10" × 6" to 20" × 12" × 10"**

# PHŒNIX *is the answer*

***EQUIPMENT DIVISION*** **THE HESTON AIRCRAFT CO. LTD**

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# Don't hide your product show it—in "CELLOPHANE"

The customer buys where she can *see* what she's buying and where the product is freshest.

ALL colourless, moistureproof types of "CELLOPHANE" are now *WATERPROOF*. They are *less affected by atmospheric variations* and have a *greater seal strength* than other types of cellulose film—which have no anchored coating.

We are the first manufacturers in the world to offer these advantages

*—at no extra cost to our customers*

***"CELLOPHANE" WITH THE ANCHORED MOISTUREPROOF COATING NOW COSTS LESS***

## Your product in "CELLOPHANE"

Let our package designers and engineers show you WITHOUT OBLIGATION how "CELLOPHANE" can increase your sales at home and abroad. Ask their aid NOW.

***SEND FOR SAMPLES AND PRICES***

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*"Cellophane" is the registered trade mark of British Cellophane Ltd. and denotes the brand of cellulose film manufactured by them.*

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SIGMUND
PumPak

## Exclusive Features include

★ **NEW VENTILATION SYSTEM**

The ventilation design keeps the bearings cool and completely free of gland seepage along the shaft.

★ **REMOVABLE STATOR**

No fuss, no special tools, no interference with pipe connections. Loosen four nuts and draw off the stator.

- *Choice of either Mechanical Seal or Soft Packing.*
- *Choice of materials.*

*The Pump with the Removable Stator*

**SIGMUND PUMPS LTD.**

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*Send me, without obligation, details of the Pumpak range.*

Name .....

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14

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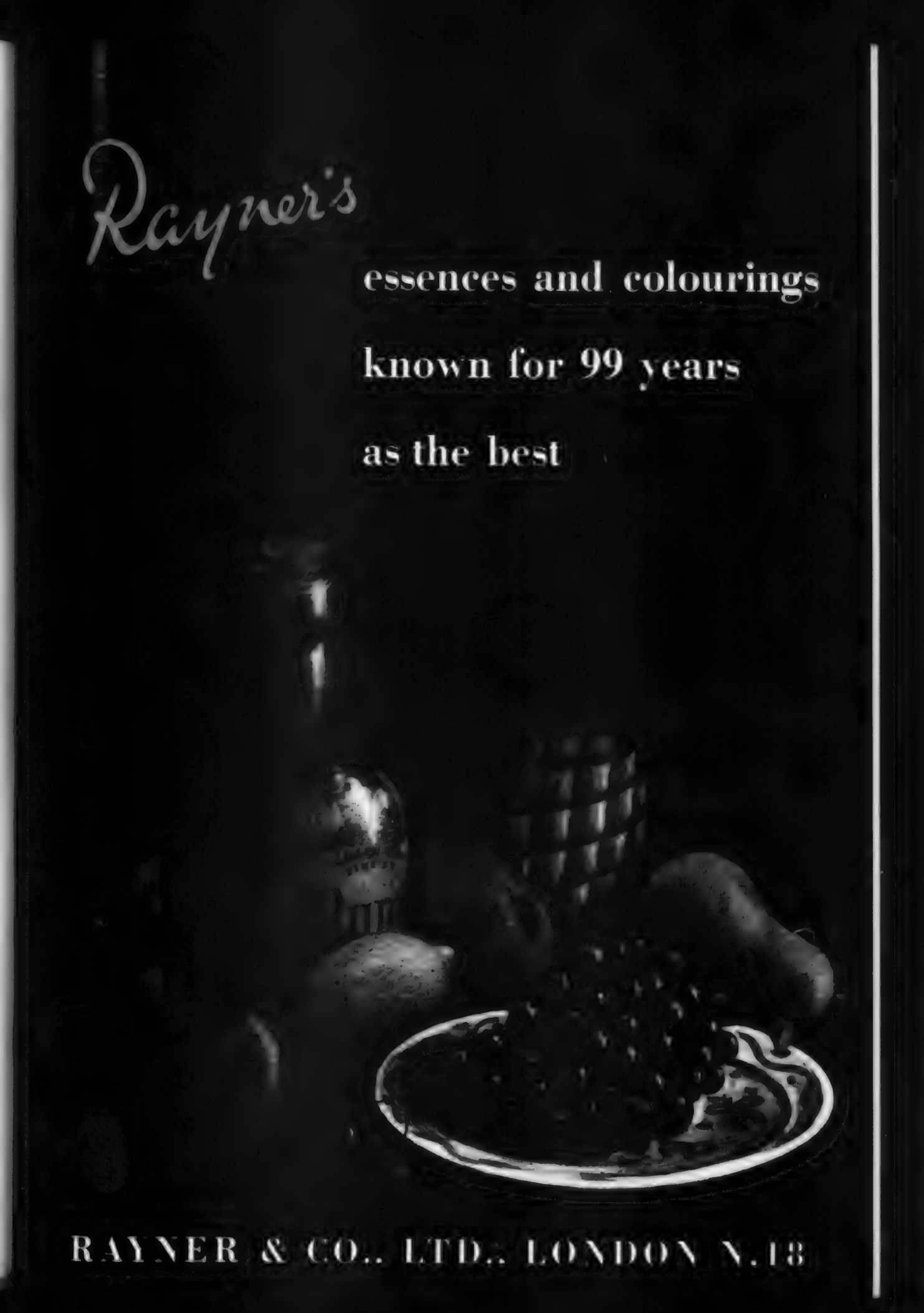
essences and colourings
known for 99 years
as the best



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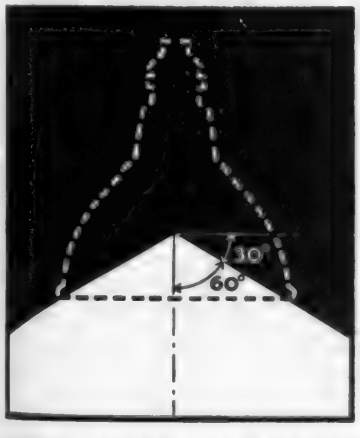
# deep bowl reflectors

## *for Quality Lighting*

Benjamin—renowned for quality in industrial lighting—now take a great step forward by introducing the Deep Bowl Reflector. Indeed, this is one of the major advances in quality lighting of modern times. By its increased depth, this reflector provides maximum comfort and clarity of vision.

***This fitting with its unbreakable plastic 'Visor' is particularly suitable for the food and allied industries where the danger of broken lamps entering the food products must be completely eliminated.***

The illustration shows the Deep Bowl Reflector with Heavy Duty Top and Dust-proof 'Visor.' These features should always be specified . . . and remember—first-class lighting demands first-class accessories! Benjamin give you all this and at practically the same cost.




*The usual Benjamin 'quality' features, 'Crysteel' vitreous enamel finish, 'Saaflux' temperature reducing and easy maintenance, are incorporated.*

*Our local Engineer is always at your disposal, write or phone for full details.*

***Better Lighting by***

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THE ADVANCED CROFTS AIRFLEX TYPE CLUTCH
with the exclusive ventilated adapter

PUBLICATION A/851/14

**DRUM-TYPE AIR OPERATION**

Only CROFT'S AIRFLEX CLUTCHES provide (1) 360° friction surface; (2) uniform friction pressure; (3) Constant-velocity contact between the full width of the friction shoes and the drum.

**INSTANTANEOUS ACTION**

The sensitive, split-second air operation of the actuating tube reduces shaft vibrations, compensates for accidental misalignment, and absorbs operating shocks and variable axial pressures.

**COOLER CLUTCH PERFORMANCE**

THE CROFT AIRFLEX CLUTCH design lends itself to maximum heat dissipation through the ventilated adapter, which creates forced air circulation though the mechanism — providing cooler clutch operation and eliminating excess wear.

**SELF-ADJUSTING**

The rugged AIRFLEX actuating tube automatically compensates for wear of friction shoes. This insures complete engagement and dependable service without mechanical adjustment.

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CROFT'S AIRFLEX design and construction eliminate the problem of clutch lubrication. Uniform friction-shoe wear reduces lost production time for maintenance

**CROFT'S AIRFLEX CLUTCHES** on your machines will provide new standards of high production and low maintenance. Thousands of "performance-proved" industrial installations have demonstrated why you should investigate the exclusive CROFT design and operating superiority —as applied to your specific equipment. The CROFT CLUTCH ENGINEERING service is available for co-operative effort to improve your equipment. Write or wire Main Office, Bradford, England.

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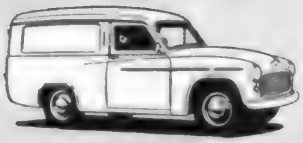

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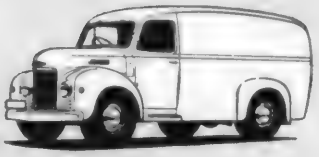
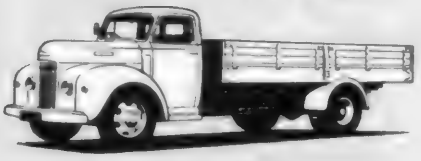
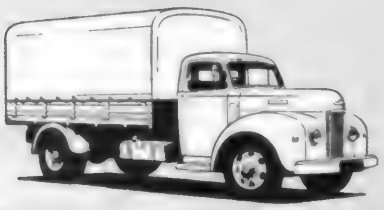


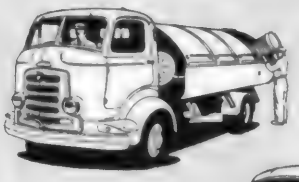
5 TON DROPSIDER



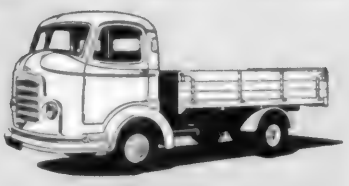


3-4 TON TILT VAN

"GAMECOCK" REFUSE COLLECTOR



"BANTAM" 2 TON TIPPER



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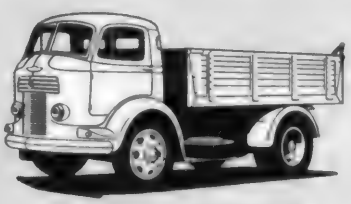
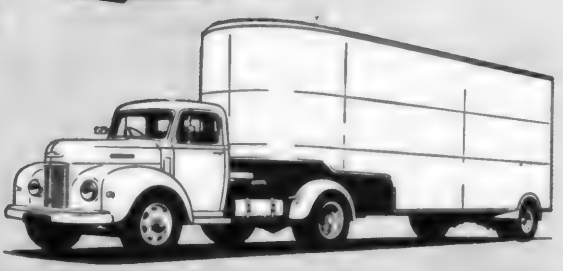


6½-7 TON TIPPER



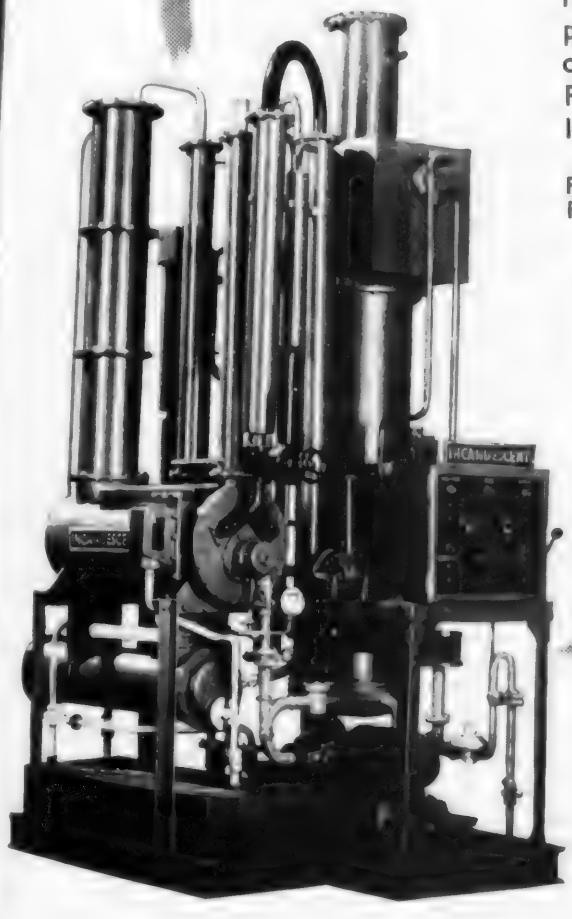
8 TON TRACTOR-TRAILER

PRODUCTS OF THE ROOTES GROUP

COMMER CARS LIMITED LUTON BEDFORDSHIRE KARRIER MOTORS LIMITED

# NITROGEN

## a protective atmosphere!



Nitrogen is an ideal atmosphere for the protection of food during manufacture or storage. An Incandescent Hi-Nitrogen Plant will enable you to produce it at low cost and on a commercial scale.

Features of the INCANDESCENT HI-NITROGEN PLANT:

- Low power consumption.
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- Easily maintained.

Available in a range of capacities from 500 to 20,000 cu. ft. per hour.

***for atmosphere preparation plant, consult:***

# *The* INCANDESCENT HEAT CO. LTD.

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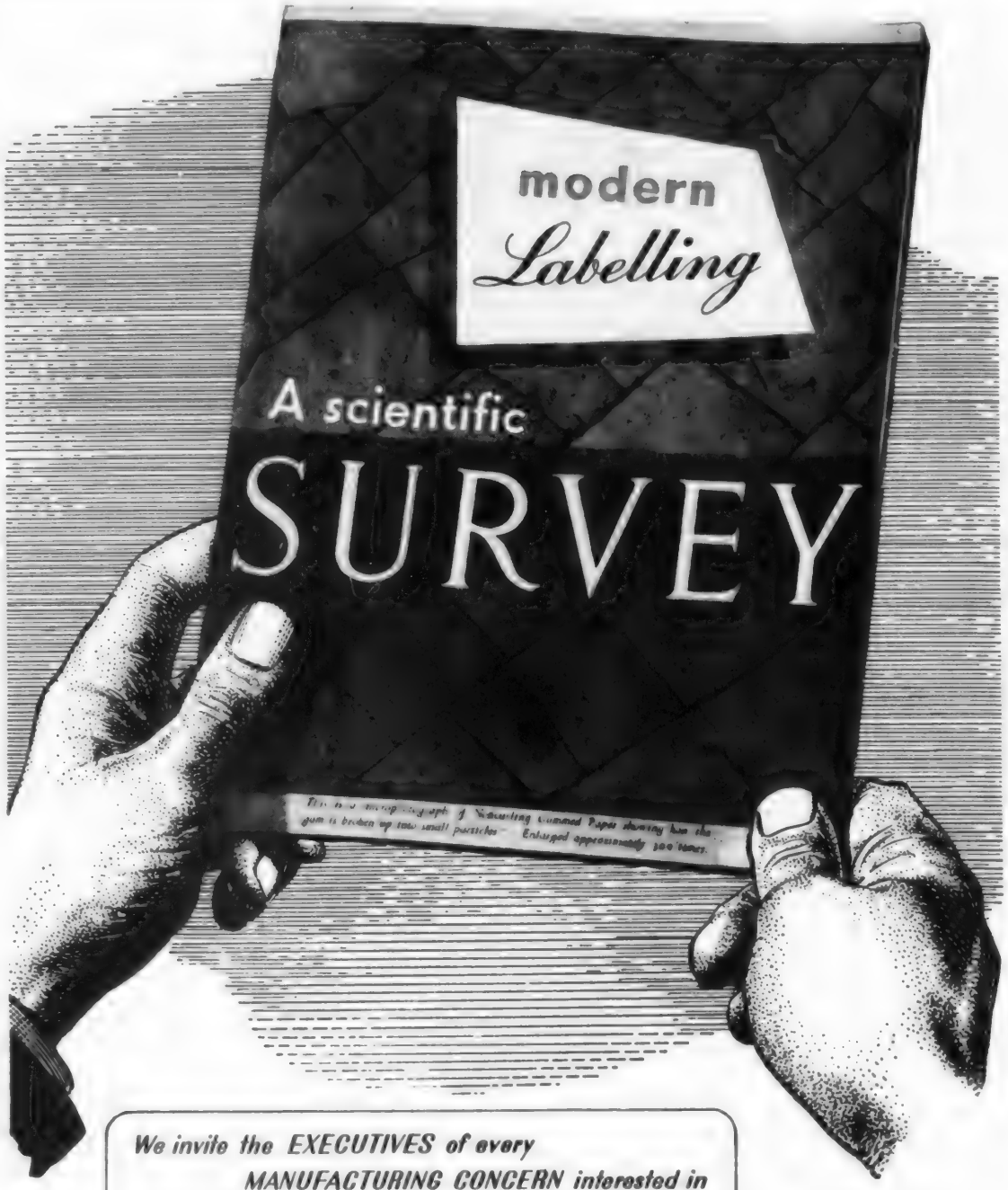


*We invite the EXECUTIVES of every MANUFACTURING CONCERN interested in*

**MODERN LABELLING**

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# FOR BETTER PROCESS PLANT OPERATION

# CONSIDER THESE POSSIBILITIES

## HEAT TRANSFER

Spirax methods improve heat transfer from steam by reducing the thickness and resistance of the stagnant films of water and air on the condensing surfaces:

1. **By 'individual steam drying'**; *small Spirax Steam Separators at the inlets to process units to ensure good dry steam for each individual unit;*

2. **By air-free steam**; *Spirax Automatic Air Vents at the correct venting points on process units, to discharge the bulk of air on starting and whenever air collects during running;*

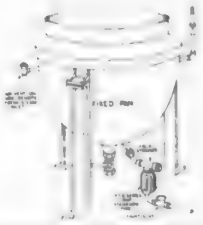
3. **By high-efficiency steam trapping**; *the right Spirax Trap, correctly chosen for the job and fitted in the correct position, to discharge condensate effectively under all conditions at the rate at which the job demands.*

Spirax give also specialist advice on condensate recovery systems and flash steam recovery systems.

*Please use the request slip.*

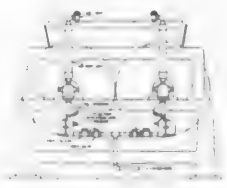
### FIXED AND TILTING PANS

*Spirax Steam Trapping and Automatic Air Venting methods for boiling pans give improved production economy.*



### DRYING MACHINES

*Spirax Steam Trapping and Automatic Air Venting in combined Units for each cylinder of drying machines.*



## TEMPERATURE CONTROL

Only comparatively few processes need anything elaborate in temperature control devices. For the majority, thermostatic control in its simple direct form is adequate, sensible and inexpensive.

Sarco Controllers have these advantages:

1. *Self-contained and self operated; no electricity or any other auxiliary aid required;*

2. *They utilise the great power of hydraulic expansion; this self-generated force is exerted* **directly** *upon the regulating valve;*

3. *Operating power is uniform, per degree of temperature change, over the whole temperature scale, giving the same powerful direct valve operation at refrigeration temperature as at high temperature.*

Sarco Regulators for heating or cooling operations (steam, water, brine and certain gas and oil applications); Sarco Blenders for mixing hot and cold liquids; Sarco Diversion Valves for recirculation and control of engine cooling-water temperature.

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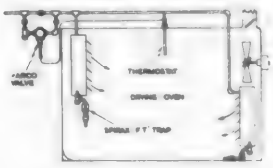
*Sarco Temperature Controllers give fully effective (direct-acting) operation at refrigeration temperatures.*



### DRYING OVENS

*Sarco Controllers for regulating steam or hot water to drying chambers, for controlling brine recirculation, etc.*

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SPIRAX-SARCO STEAM CONTROL

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*Please send the items ticked:*

..... Pamphlets on thermostatic control

..... Pocket Manual 'How to fit Steam Traps'

..... Information Sheet on 'Air in Steam Spaces'

..... Bulletin 'Steam for Process'

***Name :***

***Address :***

FM1454

# *Why* FLEXIBLE MOISTURE PROOF TRANSPARENT **Dio** *thene* (POLYETHYLENE) *is ideal for* PACKAGING *FOOD*

**FRUIT**

**ICING SUGAR**

## PROTECTIVELY TOUGH

DIOthene *stretches*, so is not easily burst nor punctured. It is unaffected by acids and alkalis; liquid proof; powder proof; moisture vapour proof. Virtually non-inflammable and frost resisting, it is excellent for tropical or deep freeze storage. DIOthene is ideal for packing in units or in bulk.

## CLINICALLY CLEAN

DIOthene is extruded in tubular form at a very high temperature. It is *sterile*, and the all-important inner surface *remains* sterile. No plasticiser is used; the purest products can be wrapped indefinitely with no fear of contamination from within or without.

## CUT COSTS

DIOthene is feather-light, so freight charges are low, and empty DIOthene bags take up almost no warehouse space compared with empty rigid containers. DIOthene is a "one-way package"; breakages, collections, invoicing of empties, and return freight charges are eliminated.

## AND SELL

DIOthene, with its silvery sheen has immediate eye and appetite appeal. The customer can *see* your product in DIOthene and its silkiness adds that touch of luxury that prompts impulse purchase. It also ensures flavour protection. *Excellent re-use value for the housewife.*

**POULTRY**

**NUTS & RAISINS**

# *in* **Dio** *thene* (POLYETHYLENE)

We can offer you DIOthene bags and DIOthene drum liners to required sizes and thicknesses, plain or gussetted, for quick delivery. **Our special printing on DIOthene in monochrome or multi-colour — including gold — gives excellent ink adhesion.** We can add the properties of DIOthene to paper, board, foils or fabrics by coating or lamination — infinite possibilities! We make, convert, design and print DIOthene wrappings all under one roof. Send us your enquiries: ask for more details. Write or 'phone today.

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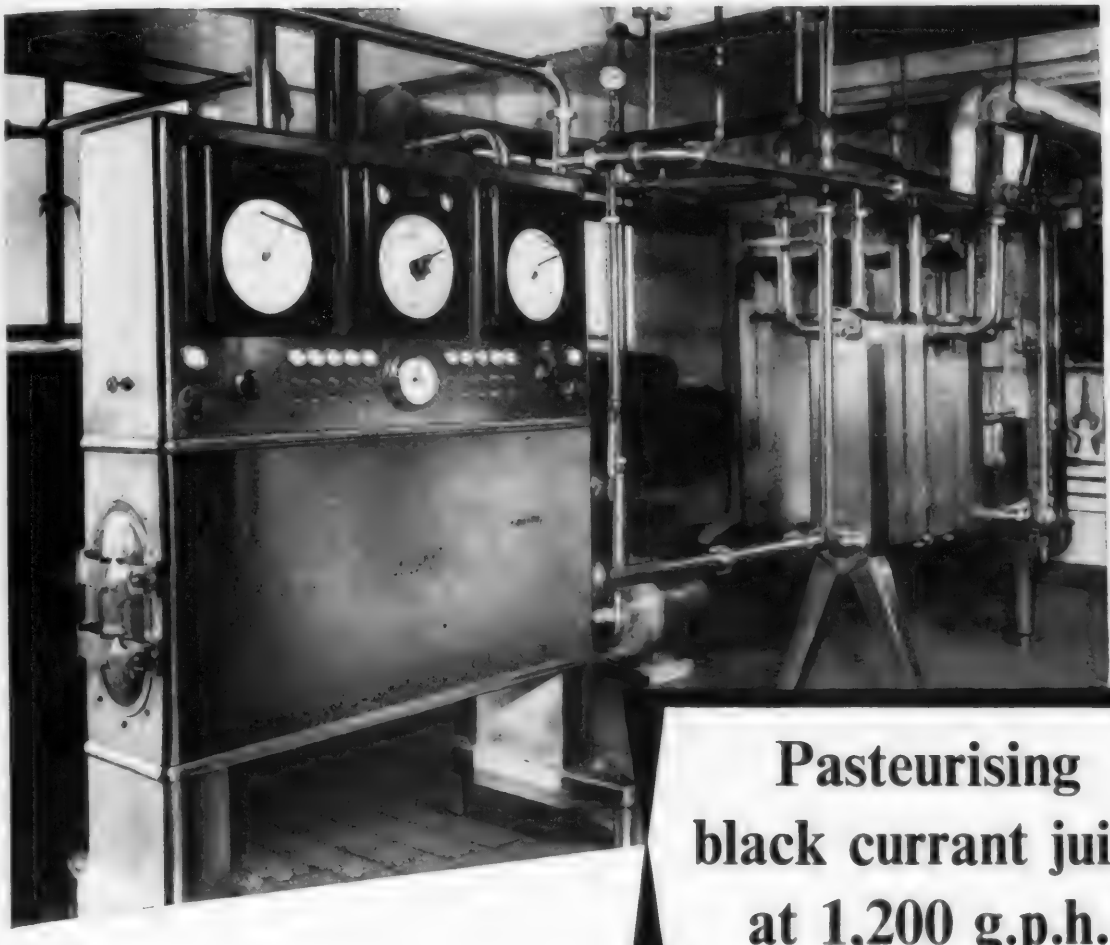

# Pasteurising black currant juice at 1,200 g.p.h.

This APV All Stainless Paraflow installation at Messrs. H. W. Carter & Co. Ltd., Coleford, Glos., is principally employed in pasteurising black currant juice at 1,200 gallons per hour for their well known "Ribena". It is also used for both pasteurising and chilling other fruit juices — an example of the flexibility of the APV system.

This plant is constructed entirely in a molybdenum bearing stainless steel that is resistant to any corrosive conditions likely to be encountered. It includes a stainless steel panel unit containing the holder tube and instruments and also a flow diversion valve which automatically recirculates any juice that falls below the correct pasteurising temperature.

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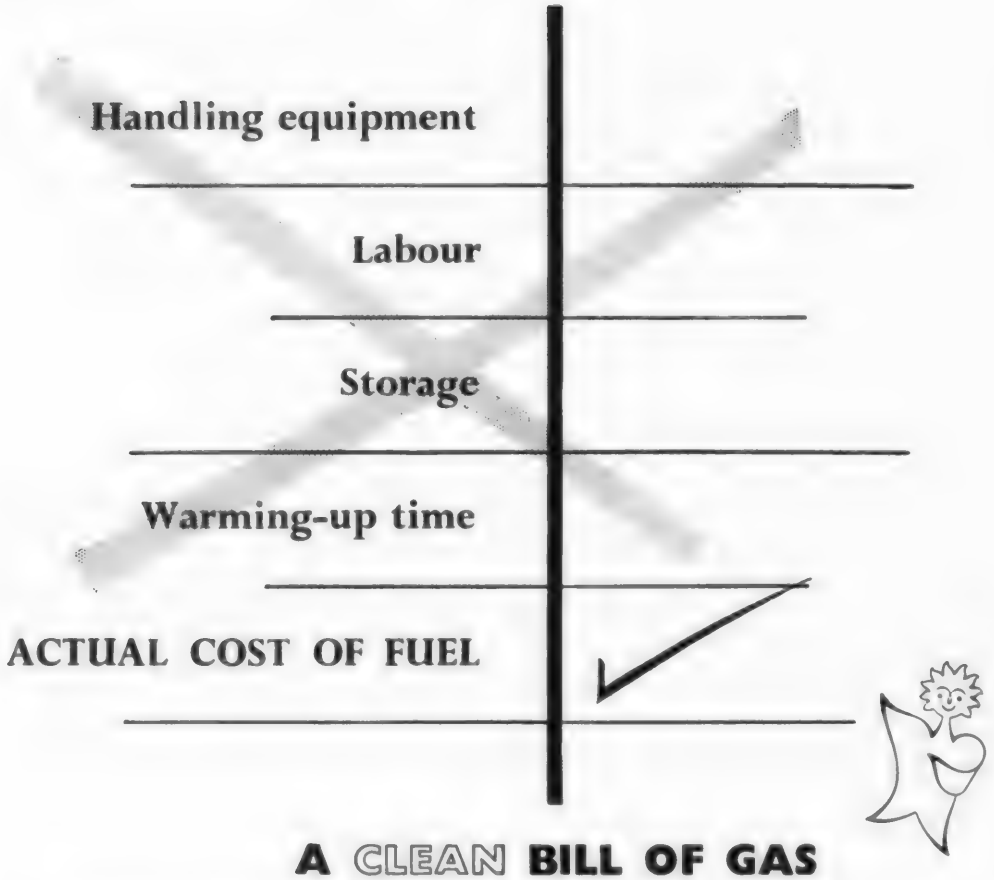
THE A.P.V. COMPANY LIMITED, Wandsworth Park, London, S.W.18

*Telephone: Vandyke 4492 (11 lines) Associated Manufacturing Companies in India and Australia*

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When you pay for gas, you pay for fuel, clean and simple. There are no extras to take into account, no storage or handling costs, no stokers to be paid, little in the way of maintenance overheads. Gas is quick to heat, flexible in its application to the needs of the thousands of industrial and commercial users it serves and infinitely controllable all the way down from fierce heat to merest glimmer. Its calorific value is constant. There is no anxiety about what the next delivery will be like (or whether it will arrive) because gas delivery is also constant, a stream of latent, reliable heat going right to the point where it is required. There are many instances in which the specialist advice of the gas industry could ensure better results for the money spent on fuel. Is yours one of them?

*What does 'not knowing' cost?*

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*The Gas Industry makes the **fullest** use of the nation's coal*

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*Engineer: Mr. J. Stephens Flooring Contractors: Wiggins Sankey Ltd., Fulham*

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**"Duratax"** *Electric*
**CAKE MIXERS**
CHEAPEST TO PURCHASE AND MAINTAIN

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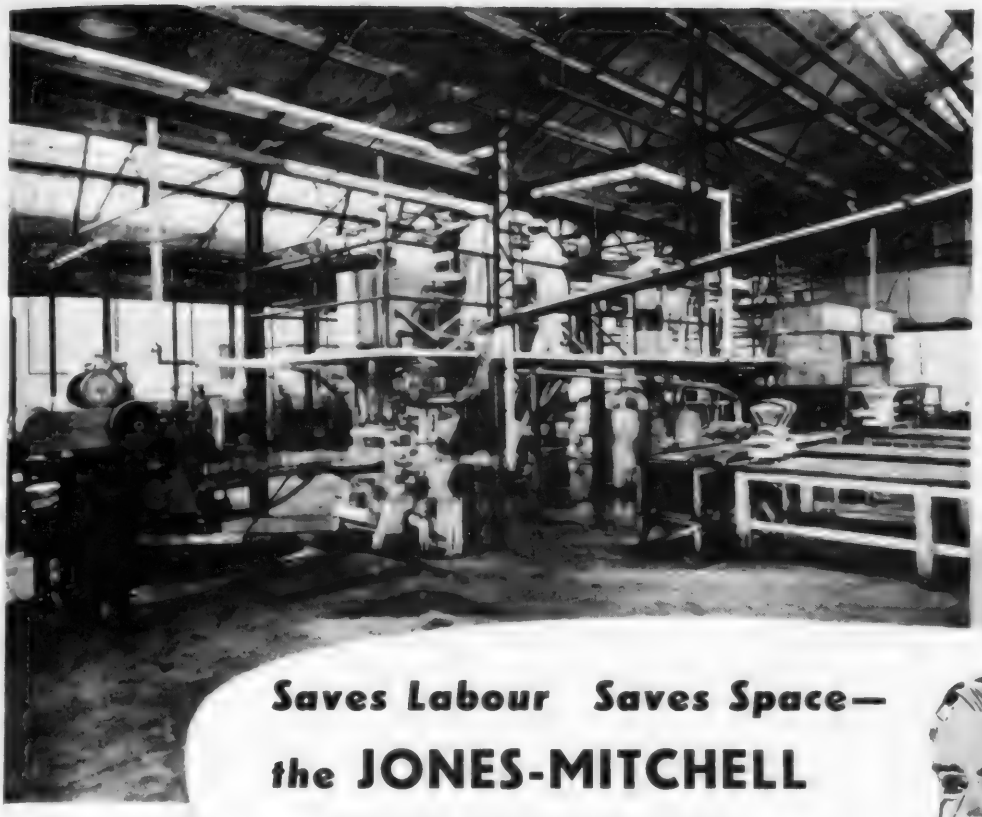

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# the JONES-MITCHELL

**PATENTED HYDRO-SYSTEM PROCESS**
**PEA AND BEAN CANNING EQUIPMENT**

The Jones-Mitchell Hydro process pea and bean line from the seamer and filler end.

Absence of moving parts and compact design contribute to the space and labour saving features of the Jones-Mitchell Hydro-System Process Pea and Bean Canning Equipment. Its handling is efficient and hygienic and the finished product has an attractive appearance.

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# I.C.I. GRANULAR SALT

## *for the bacon curer*

I.C.I. GRANULAR SALT is a new grade of coarse vacuum salt, specially designed for use in place of crystal salt for the tank curing of bacon.

EASILY HANDLED

- Lower cost
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- Contains no Panscale nor Calcium or Magnesium impurities
- Gives a clear brine free from scum and sediment
- Available in hygienic multi-ply paper bags

*Details and technical advice regarding this new salt may be obtained from:*

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ICI

**WHY FLOORS FAIL 4**

# FLOOR DESIGN

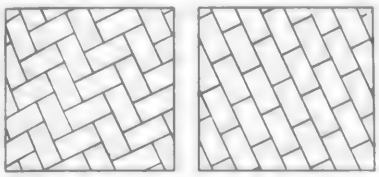
### *DRAINAGE FALLS*

The importance of good drainage falls in a floor designed to resist the attack of corrosive liquids cannot be over-emphasised. A dependable corrosion-resistant brick or tile will withstand the effects of most chemicals: the weak points in a floor, however excellent the cement, are at the joints. If drainage falls are inadequate, corrosive spillages will rest in the joints and may eventually break down the bonding material and "lift" the tiles or bricks.

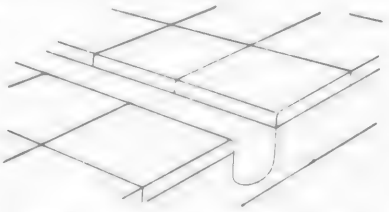
A well designed floor has drainage falls which, although imperceptible to the casual observer, are both definite and regular. It does not allow corrosive liquids to stagnate and is so designed that washing water flushes away all traces of spillage. At the same time it presents an apparently level surface to traffic.

### *DESIGN POINTS TO WATCH*

Herringbone or broken bond patterns are, in the main, the most suitable designs for tile floors. Although they add somewhat to the initial cost they prevent expensive and time-wasting alterations at a later date • In order to obtain tight joints, tile edges should be clean cut, preferably by machine: the narrower the joint, the less cement exposed to corrosive action • Lipping from one tile to another must be eliminated if cracking of tiles and chipping of edges is to be prevented • The avoidance of weak edges at gullies is of extreme importance if the installation is to withstand normal day-by-day usage • Size, type and thickness of the tiles or bricks selected will be governed by such factors as severity of traffic and will need careful consideration by an expert if the finished floor is to be completely adequate • All these points and many others require the attention of technicians versed in the vagaries of floor design.



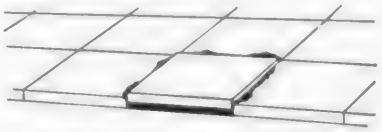
*Herringbone or broken bond patterns . . .*



*The avoidance of weak edges at gullies is of extreme importance . . .*

### *BONDING IS ALL IMPORTANT*

The conventional method of laying tiles (placing them on a cement bed and filling the joints from the surface) leaves air pockets in the joints and allows corrosive liquids to seep through to the base. The Semtex craftsman using special Semtex jointing and bedding compounds, squeezes the cement from below the tiles up into the joints, thus ensuring that they are full of the resistant material. Expert advice is essential in the selection of these bedding and bonding materials. With an unrivalled knowledge of the properties of natural rubber latex and of synthetic latices, Semtex Ltd. (a Company of the Dunlop Group) is able to put forward bonding agents and jointing compounds which, whilst possessing the necessary chemical qualities, have both great adhesive strength and the essential property of flexibility.



*Badly laid tiles will quickly "lift".*

Successful installations in industrial plants all over Britain provide ample proof of the skill of Semtex Industrial Division. When you are thinking of installing a new floor, or renewing an old one, you will undoubtedly find it helpful to seek the advice (without obligation, of course) of the Industrial Division of Semtex Limited. Why not drop them a line NOW?

**GET YOUR SECRETARY TO CUT THIS OUT AND FILE IT— YOU MAY FIND IT USEFUL.**

**consult SEMTEX INDUSTRIAL DIVISION**

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# Rapid pea/bean filling made clean splashless by new auto machine

Type 1FF 10-head Automatic Pea/Bean Filling Machine.

## This new Kellie model

**fills half the liquid, then the solids, finally the other half of the liquid. Air does not trap in the cans nor liquid overflow. Up to 180 cans per minute, in all sizes up to A2½. Self contained motor as illustrated or synchronised drive from the Double Seamer.**

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*in liquid and in powder form*

Firmajel pectin is ideal for high-quality jams and jellies and for confectionery processes. It is used in many industries for stabilising, emulsifying, binding, coating and other purposes.

Bulmer's—the world's largest producers of apple pectin—offer the advice of their Technical Service on the best pectin for *your* purpose. Advice, samples and quotations are free on request.

**Liquid Pectins.....in tanker, casks or cans**

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**H. P. BULMER & CO. LTD., HEREFORD**

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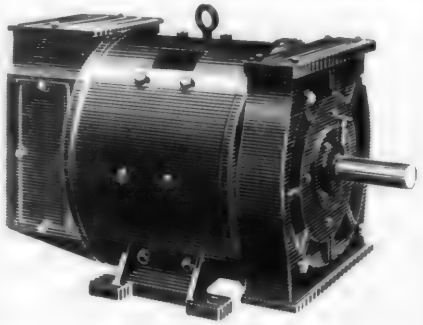
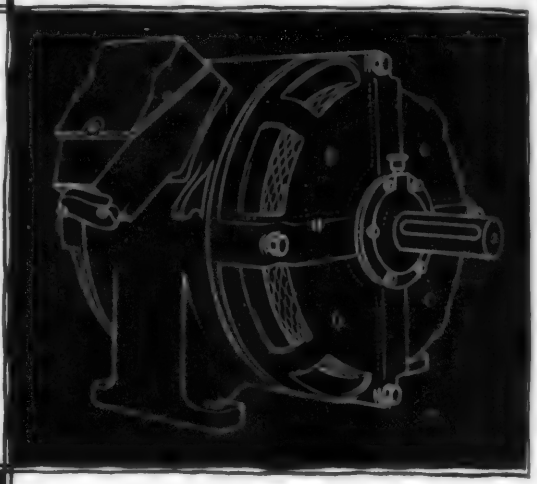
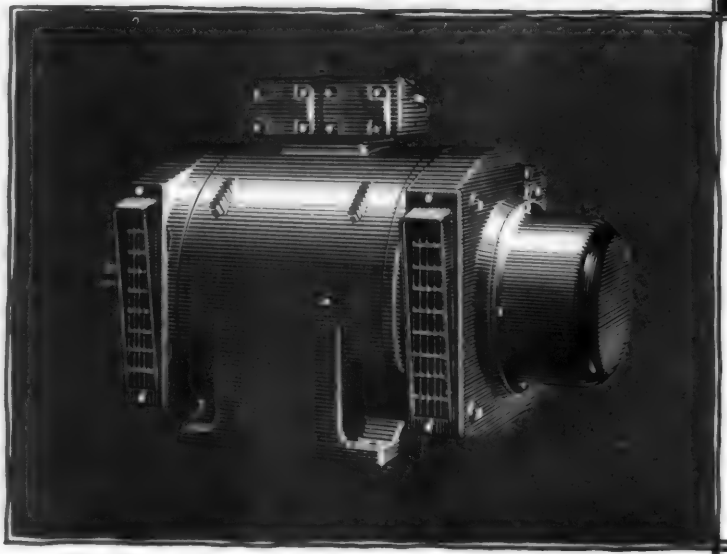


*They bear*

*the name* **G.E.C.**





*...and a name for* **RELIABILITY**

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*STANDARD INDUSTRIAL MOTORS*

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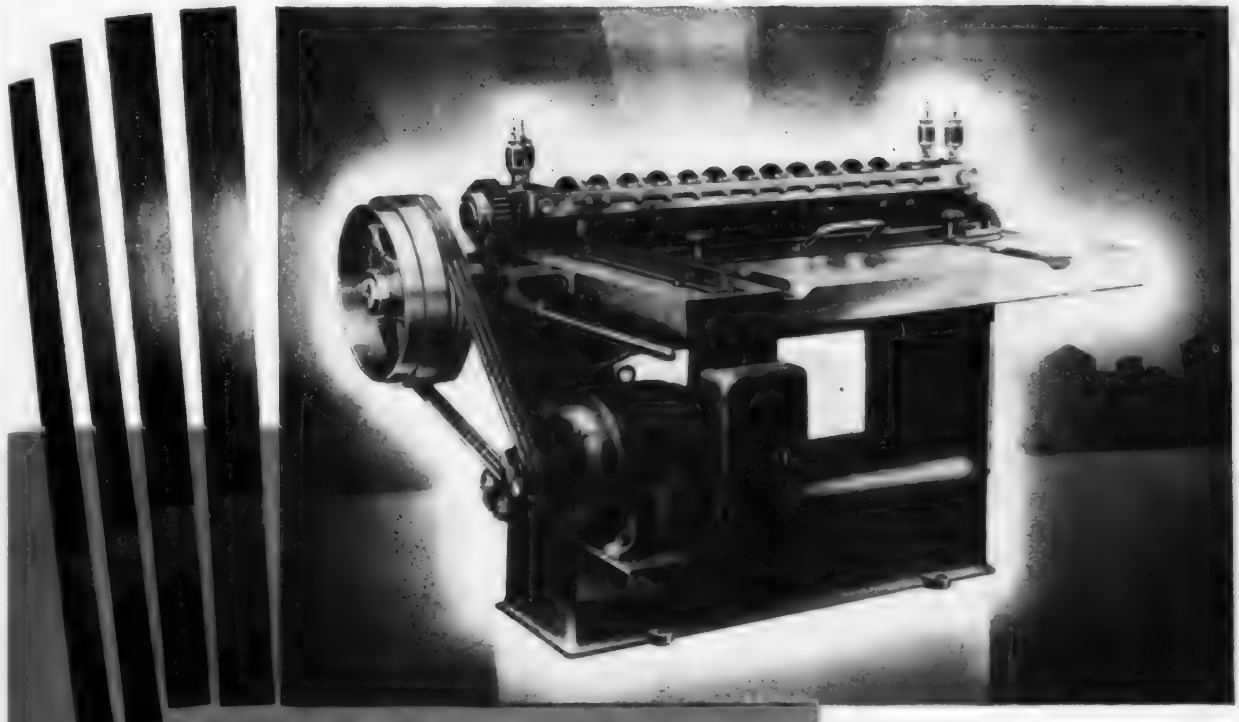

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## Built to slit straight, fast and true . . .

## and stay that way for years

Whether you want to prepare blanks for can body-makers, cut strips for Strip Feed Presses, or trim sheets for litho machines, you can't buy better than Bliss.

These rotary-type machines are engineered to yield consistent, accurate slitter output. Solid one-piece bearings, heavy frames and end thrust bearings combine to give the accuracy you need—and give *it* hour in and hour out over years of steady production.

Cutters may be set to shear on either edge and furnished with adjustable hubs, in standard or narrow widths. A grinding attachment which sharpens the cutters in position is available as are a variety of special gauges.

If you want accurate, dependable slitter production, the Bliss Gang Slitters are worth investigating.

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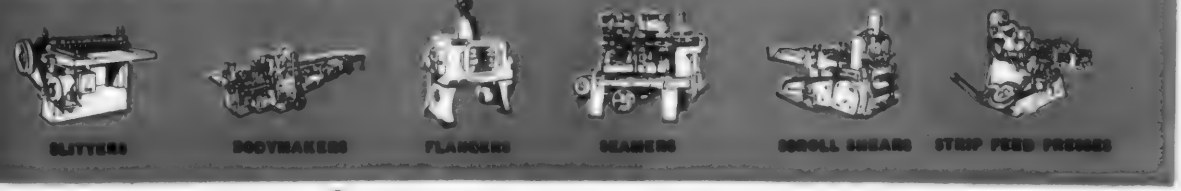

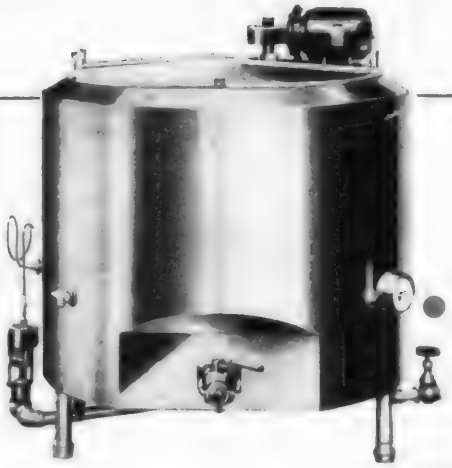

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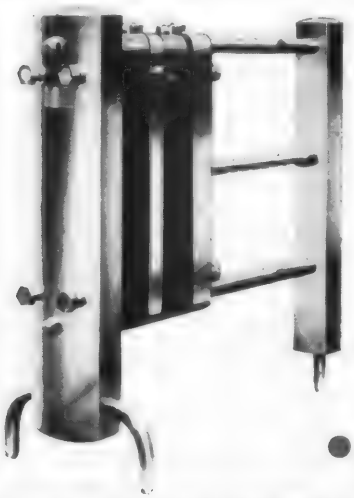

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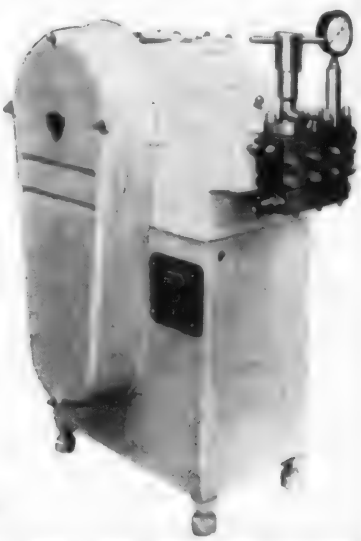
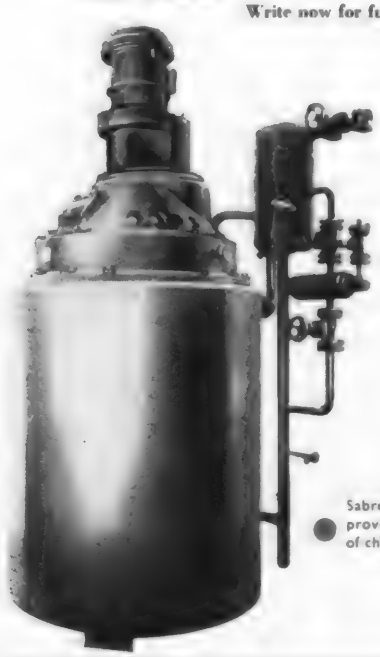


Concentrate Mixing Tank.



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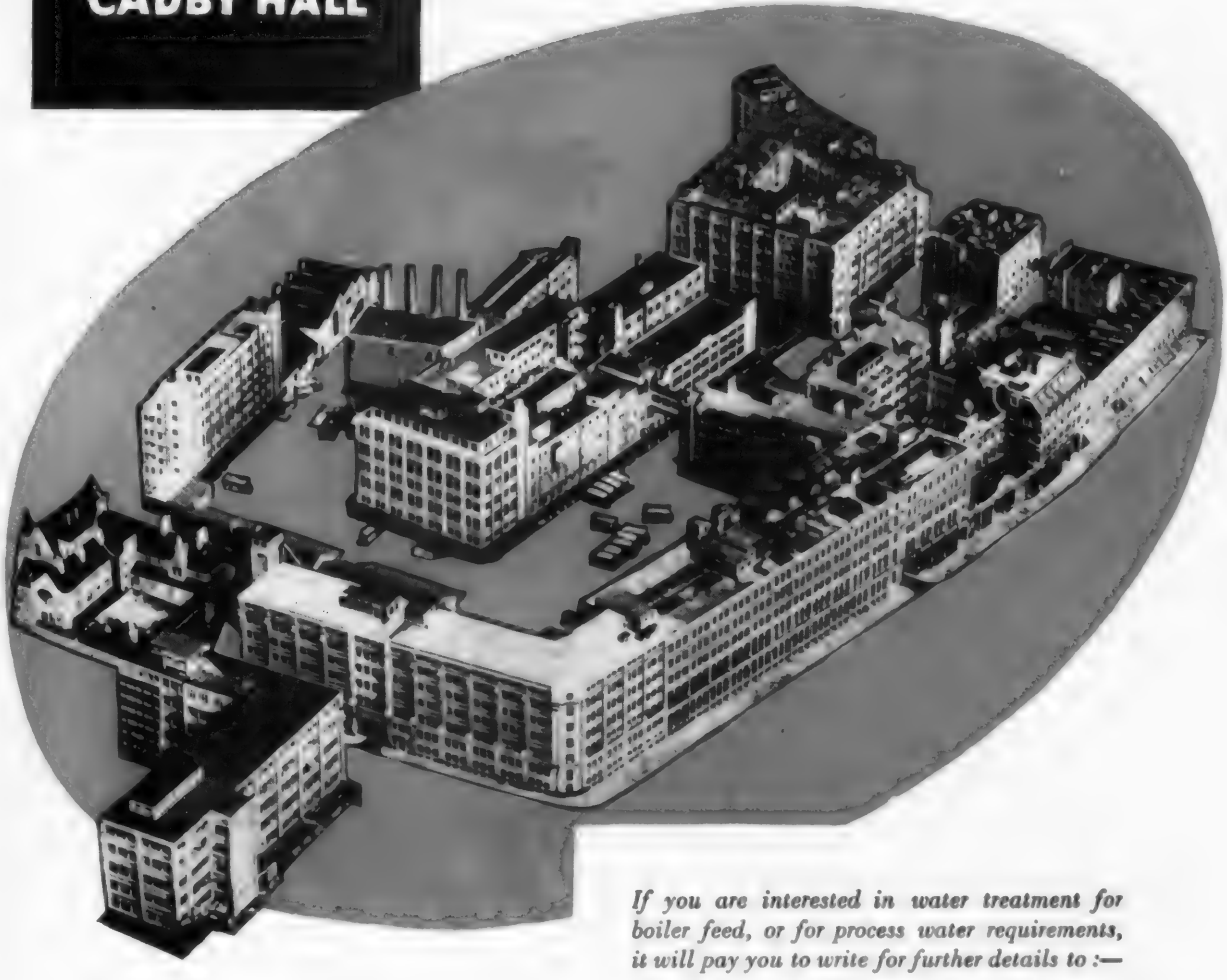

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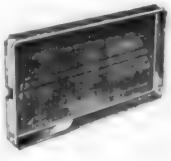

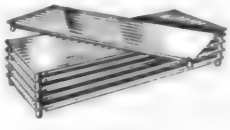

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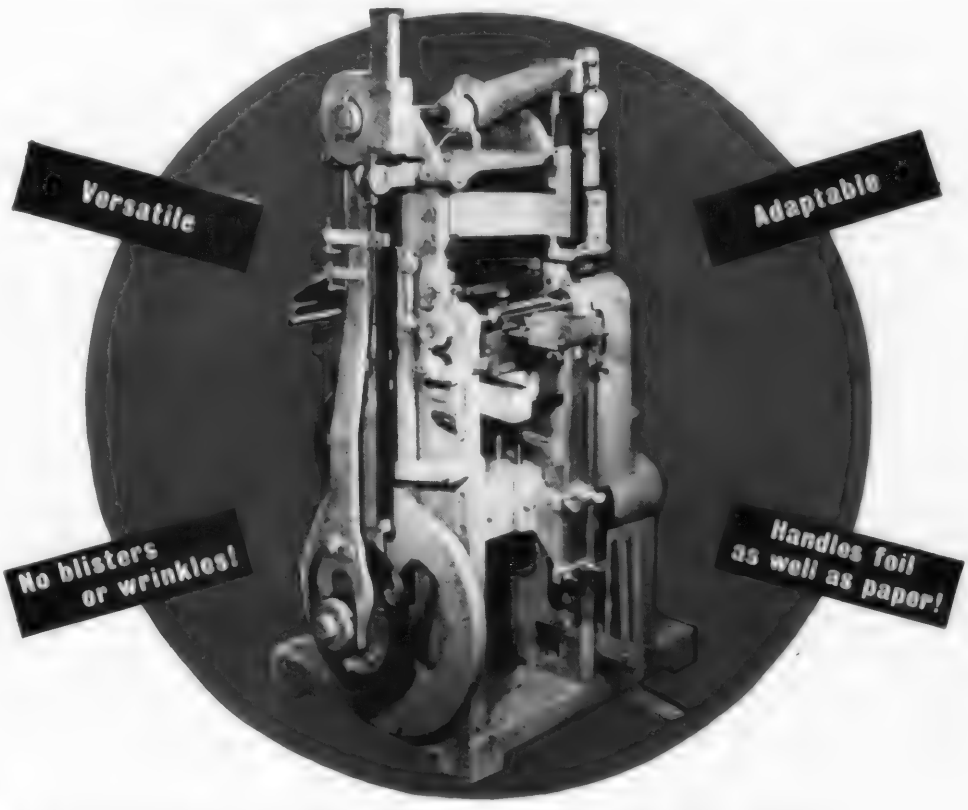


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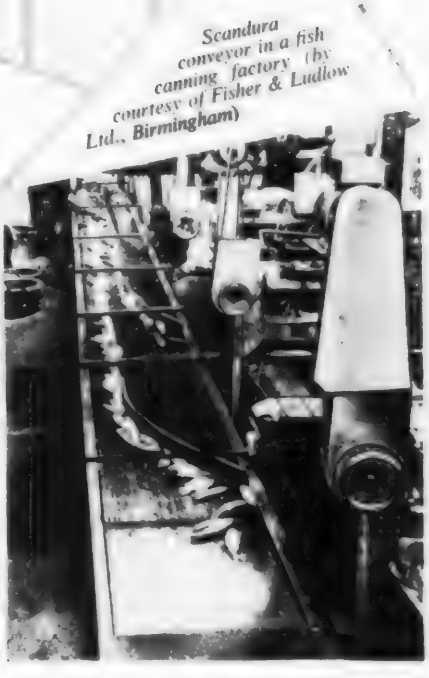
*Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)*

*Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)*



*Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)*

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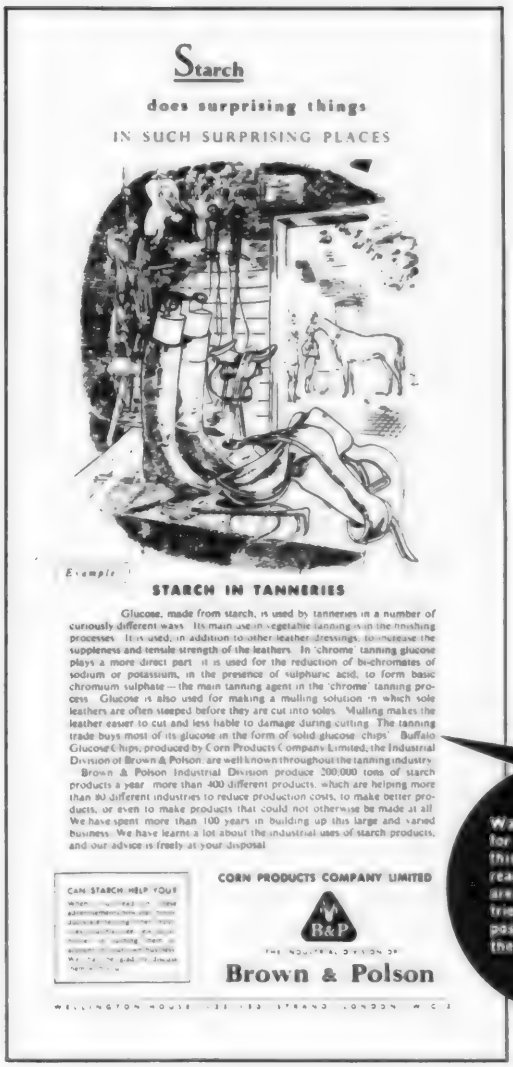
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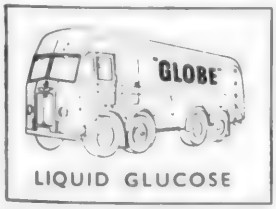


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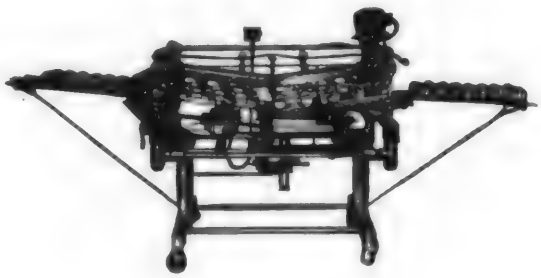

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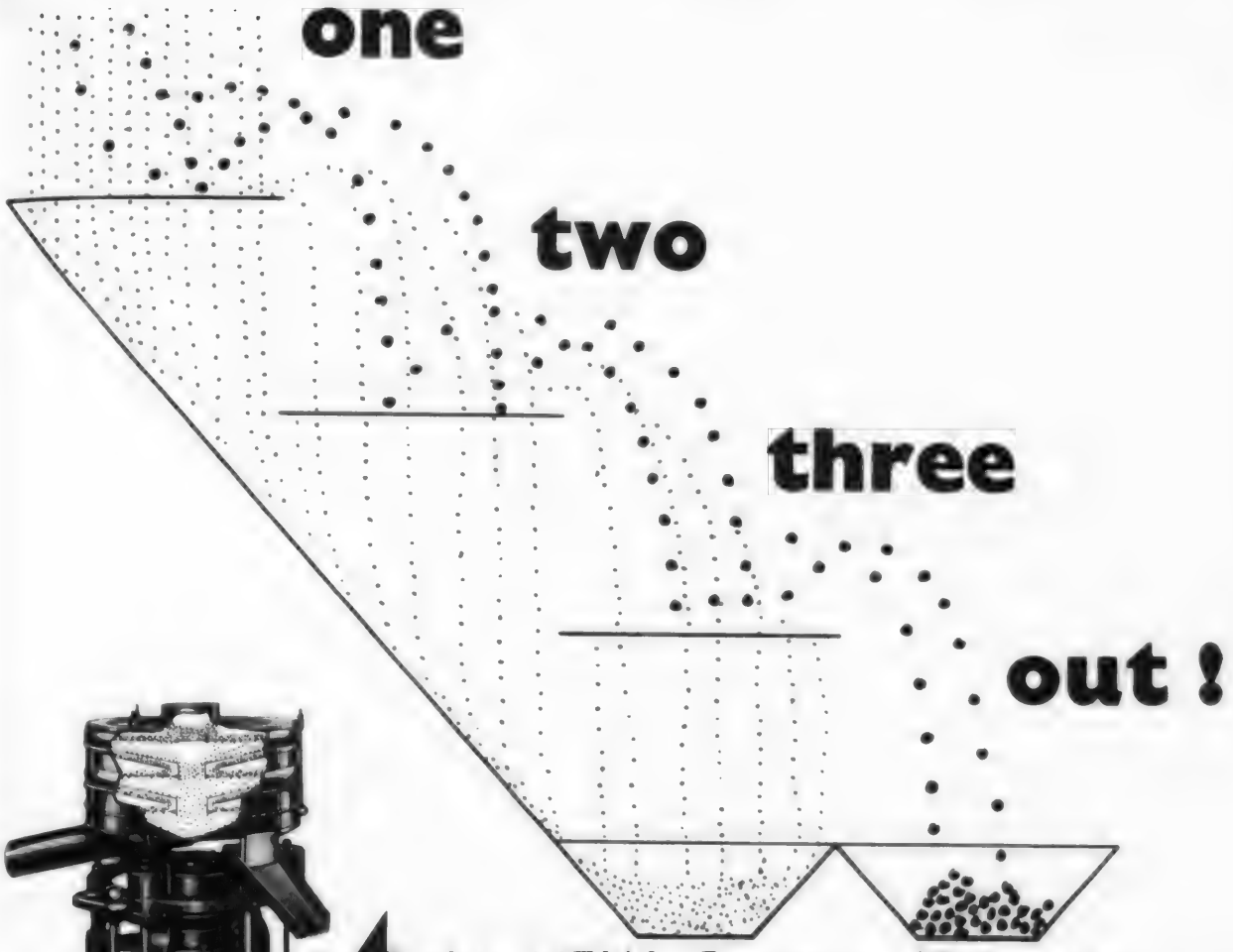


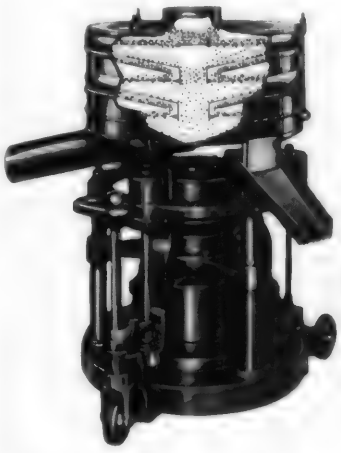

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# FOOD MANUFACTURE

**Vol. XXIX. No. 4 · Published Monthly · April 1, 1954**

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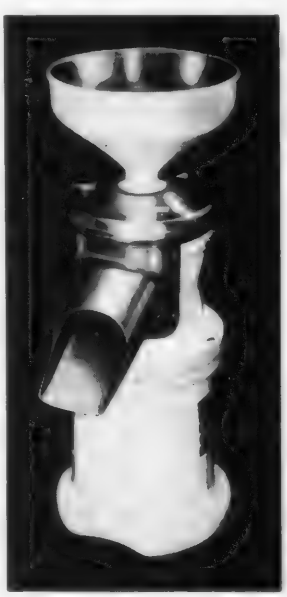

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FOOD MANUFACTURE

Vol. XXIX, No. 4 April 1, 1954

## *Electricity and Food Production*

THE important part being played by the North of Scotland Hydro-electric Board in encouraging activity in the food industry is noted in a recent survey. The function of the Board is to provide power to allow expansion of existing industries and to encourage the launching of new ones.

In the five years to 1952, the Board supplied electrical power to 198 industrial concerns for the first time; it also facilitated the establishment of some 30 new industrial units which, albeit small, are important to the area. They include an alginate factory at South Uist, the Herring Industry Board factory at Lerwick, its factory for oil reduction at Wick, and the deep freeze plant at Thurso.

Deep freezing of salmon has been made possible at Montrose, canning is being carried out at Carnoustie, and dehydrated vegetables are being produced at Errol—all as a result of the advent of power. Most of the developments are linked to fishing and agriculture, but ancillary activities have been noted in the programme of development.

The availability of hydro-electric power is widening the field of activity of the food industry in these areas, the only limitations being the distance from the main consuming centres and the cost of freight.

## *Bulk Transport of Oil*

EXPERIMENTS to counteract the solidification of hard oils carried by road tankers have recently been undertaken in Glasgow.

These hard oils or fats are solid at room temperature, and although the tanks are insulated, previous experience has shown that, particularly during the winter, some solidification can be anticipated at the bottom of the tank. Where long distances are involved, the problem is considerably greater.

The unloading of a tank is frequently made more difficult because of this layer of hard material on the bottom, and after discharge the solid material remaining has to be removed by steaming out, which is both time consuming and wasteful, since the fat thus removed is degraded.

To overcome this, a tanker was fitted with an experimental heating unit with the object of ensuring a continuous flow of hot air under the tank.

The vehicle selected for this experiment was a new eight double drive unit carrying a 3,125 gallon Butterfield tank. The heat transfer unit utilises engine heat and this heats air which, by means of a fan, passes through a 2 in. inlet into a hot air duct. This duct runs the whole length of the tank under the area where the solid material normally collects.

Whether the use of this device will be successful has not yet been proved. A good deal depends upon proper operation by the driver, who could, by circulating cold air, actually cause solidification.

In the past, various attempts have been made by different operators to overcome this difficulty, including both hot water circulation in pipes within the tank and the installation of exhaust pipes passing through the insulation along the bottom of the tank. For various reasons, each of these has been abandoned and it is hoped that this latest attempt will be more successful.

As in other spheres, the tendency today is towards bulk transportation by tanker wherever possible and such a solution is of obvious importance in the efficient use of these vehicles.

## *Corrosion Technology*

CORROSION, involving the deterioration and loss of plant, equipment, buildings, and finished products, is a very serious menace to industry. In Britain alone, its cost is estimated to reach the stupendous figure of £200 million a year.

The need for an authoritative journal covering the subject in all its ramifications has been filled by *Corrosion Technology*, a new monthly journal of the Leonard Hill Technical Group, publishers of FOOD MANUFACTURE and 11 other journals.

Each month, experts will contribute articles on corrosion problems and their solution: the use of corrosion-resistant plant and equipment, resistant metals, alloys, plastics, and other materials, protective coatings and finishes, metal pre-treatments, cathodic protection, anti-corrosive chemicals, inhibitors, testing methods, and research.

As it is in the chemical and process industries where corrosion problems are most acute, the new journal is making its debut as a supplement to *Chemical and Process Engineering*, another journal of the Group.

## *Marsh Spot and Pea Processors*

SO-CALLED because it was first found to be prevalent on marshy soils in this country over a century ago, Marsh Spot is a deficiency disorder associated with lack of manganese in the soil and does not develop until the later stages of maturity of the pea crop.

Its effect on the quality of threshed peas can be serious to the canner and packer. Research in Holland indicates that taste becomes unsatisfactory and the texture of the peas becomes tough, leading to uneven cooking when the degree of infection exceeds 15 per cent.; when it reaches 30 per cent. these undesirable features become still more pronounced. As the result of experiment has demonstrated, the storage of affected samples for several months produced no significant changes either in the proportion or degree of infection or in the quality.

In Holland there are statutory powers forbidding more than 15 per cent. Marsh Spot in peas offered for consumption, of which not more than 4 per cent. may be seriously affected.

It is in the interests of purchasers of peas, whether intended for consumption or for seed purposes, to examine them for the presence of Marsh Spot and to advise those growers whose crops are affected, so that remedial measures can be applied.

## *Ice Lollie Standards*

A REPORT from the chairman of the Liverpool Branch on the recently announced views of the Liverpool Medical Officer of Health regarding standards for ice lollies was considered at a meeting of the National Executive Council of the Ice Cream Alliance.

The Medical Officer of Health had stated that in his opinion ice lollies should not contain more than one part per million each of lead, arsenic, antimony, or cadmium, and in the case of copper and zinc, not more than five parts per million. He had also expressed the view that ice lollies should not contain less than 7 per cent. of sugar and any saccharin present should not exceed one hundredth part of the amount of sugar.

While the Council had agreed at a previous meeting that standards for ice lollies were desirable, there was no evidence to show that there was any problem arising from metals other than lead. It was unquestionably in the interest of both the public and the trade that there should be a limit on the lead content of ice lollies, but the Council could not agree that the figure should be as low as one part per million.

Enquiries into the methods normally employed for the determination of minute quantities of lead had indicated the possibility of considerable error in results, and the Council were of opinion that any limitation on the lead content of ice lollies should allow for such inaccuracies. The standard recommended by the Liverpool Medical Officer of Health did not do so, and was therefore unacceptable to the Council, who agreed that a reasonable limit would be two parts per million.

The Council went on to discuss standards of composition for ice lollies, and having taken into consideration the views expressed by Divisional Committees, agreed that any standard should be based on a minimum of 10 per cent. sugars; limitation of saccharin was considered unnecessary.

It was also felt that the fat and milk-solids-not-fat content of ice lollies sold under the description "cream lollies" required the fullest consideration in order to protect the interests of the trade and consumer.

Discussing the application of standards, the Council were of opinion that they should be applied to all frozen confections other than ice cream, in order to prevent the evasion of requirements by the use of descriptions other than "ice lollie." It was also the Council's considered view that any standards applied to ice lollies should incorporate standard sampling and examination procedures.

## *Labour Problems in the Meat Industry*

BECAUSE of the scarcity of skilled craftsmen and the limited intake of new workers, considerable changes in food handling techniques are being considered in Scotland, particularly by the meat trade. The solution which is envisaged is the establishment of central meat processing and packing centres and distribution through non-skilled outlets, as against the traditional method of distribution by individual units, each doing its own processing or preparation.

The skilled craftsman is loath to contemplate such a step, but the present scarcity of labour is forcing the hand of the meat trade. The position is being examined by the Co-operative Societies to determine whether their future policy will be to encourage the idea of centralised packing or not. Already there has been a swing in this direction and current indications suggest that the ultimate decision will be to adopt such a policy.

## *East African Land Development*

THE main portion of the Report for 1952-1953 of the Overseas Food Corporation is devoted to an account of the agricultural operations in several areas and while the study is as yet incomplete, there is emerging a pattern of agriculture which, although varying between the areas, shows possibilities for the future.

In the slow-down of the activities, the area under cultivation dwindled to about 40,000 acres, with which was operated the new scheme of large scale experimental development to establish the economics of clearing and mechanised agriculture under tropical conditions.

According to the Report: "It cannot be too strongly stressed that the task on which the Corporation is now engaged is purely investigational, the original conception having been laid aside. Provided this is accepted and it is appreciated that the objective is solely to determine whether or not large tracts of previously unused land in East Africa can be tamed and brought into economic production by the application of modern agricultural practices, then it is possible to report a year of steady progress and encouraging results."

Dealing with finance, the Report states that as a result of the original conditions under which the farming areas were planned for a much greater acreage than that now cultivated, the cost of some major services was still very high and out of proportion to the benefit obtained from them.

## *Protein from Leaves*

CONSIDERABLE work has already been done to examine the possibility of obtaining protein from fresh leaves. In the report for 1952 of the Rothamsted Experimental Station is a special section in which N. W. Pirie has reviewed the results obtained to date.

One of the difficulties encountered in the introduction of modern agricultural methods into undeveloped areas is the lack of power to run tractors and pumps. The residue of leaves from which protein has been extracted might be a valuable fuel.

The separation of protein from leaves depends on three propositions:

1. That the leaf is the best place to look for further supplies of protein.
2. That the protein and other components of the leaf are of more value after they have been separated from each other than they were when they were mixed.
3. That there is no better method of making the separation.

The first point is self-evident, all the terrestrial protein sources now used on a large scale, *e.g.* beans, meat, and milk, depending on the leaf.

The only unusual feature of leaf protein separation is the intimacy with which the useful and less useful parts are mixed in the starting material. If leaves are to be used as a source of protein in the human diet, it would be necessary to grow leaves with an exceptionally high protein content. Research on the conditions needed for a plant to produce high protein leaves regularly and a search for the species that can be easily made to do this would be both interesting and valuable, but for some time it is likely to be easier to grow a lower quality leaf and then to separate the digestible protein from the indigestible fibre.

Although several commercial projects for making protein or protein concentrate have been started, Mr. Pirie states that all the evidence from the work done at Rothamsted and elsewhere suggests that it is better to start with an adjustable mill that can produce an approximately standard product from a wide range of raw materials and then to feed this product into a press. Research is still needed until a workable unit has been built.

Besides the work that is needed on the machinery there is also much scope for botanical and agricultural work. Hitherto a forage crop has had to possess a texture and flavour acceptable to stock. Most of the necessary research to find which plants give the biggest return of dry matter and extractable protein per acre can be done on small scale plots. But once some conclusions have been reached, they need confirmation by large scale extraction, partly to confirm the laboratory results and partly to get enough protein to be sure that it has the expected feeding value. It may be that no crops better than those already in use, either in Britain or overseas, will be found at an early stage in the work, but the standard crops offer much scope for variation.

The effect of fertilisers and irrigation is already being actively studied at Rothamsted; this work could usefully be supplemented by a study of the extractability and quality of the protein. All the leafy agricultural wastes also need examination as do plants such as bracken and sedges that grow on uncultivated areas.

Work on the large scale extraction of leaf protein has now been going on in an uncertain manner with support from various Government departments for 13 years. It seems to have arrived at a stage when, with little more effort, a conclusion could be reached and machinery designed which would be suitable for use both in Britain and overseas.

## *Toxic Residues in Food*

THE report of the Working Party on precautionary measures against toxic chemicals used in agriculture, the residues of which may be present in food, is evidence of a very thorough enquiry on the subject, the main headings being:

(*a*) The substances that are being used, or that it is proposed should be used, to protect growing crops and stored foods.

(*b*) The extent to which these compounds are used, and the stage at which they are to be added to growing or stored food.

(*c*) The extent to which the food consumed is contaminated by these materials.

(*d*) The effect such contamination might have upon the consumer.

(*e*) The present arrangements for controlling the use of these substances, and whether the Government Departments have sufficient powers to obtain information about new substances before these are brought into use, and to protect the public against substances which, by reason of toxic residues, may be harmful to health.

Major attention has been given to the compounds

which have been introduced in recent years, such as DDT, BHC, parathion, TEPP, schradan, tecnazene (TCNB), propham (IPPC), and DNC. A description of crop-protecting chemicals, with details of their chemical formulae, is contained in a useful Appendix.

No less than 45 trade and professional organisations were approached for evidence on the use of toxic chemicals in agriculture and in the storage of foods; on the risks to public health arising from the use of these substances; and on the residues which may remain on food at the time of sale.

In the summary, 10 items are set out, all evidencing the importance and complexity of the problem. The last of these, mentioning the general lack of information about the use of crop-protecting chemicals, and suggesting that the situation could be improved by augmenting the existing facilities for obtaining such information, underlines the necessity for energetic action.

## *Small Town Fluorination Fight*

An amusing account of the rumpus which started in a small New England town is given in *The Scientific Monthly* (**77**, 5, 240). The question of flourination of the local water supply arose at the 1952 town meeting, when two local dentists testified that the American Dental Association had endorsed fluorination as a safe and effective way of reducing dental decay, whereupon an order for equipment was placed, which duly arrived in January, 1953.

By this time, the opposition had become vocal and an item was placed on the agenda for the forthcoming 1953 town meeting to sell the equipment. The opposition expressed its views in a series of letters to the local papers. "Fluorination was a dangerous practice, fluorides were rat poison, cities which had adopted fluorination showed marked increases in heart and kidney disease, bone fluorosis, stillbirths," and so on.

Opposing attitudes ranged the whole spectrum of belief from the thoughtful conservatism which argued that the town ought to wait a few years until more was known, to the frantic assertion that fluorination was a satanic (or Communist) plot.

Advocates of fluorination sought to meet the issues. They read scientific articles and wrote letters to the paper, stating facts and figures from the Newburgh experiment, giving statistics from areas of the country where fluorides occurred naturally or were added to drinking water, showing that dental health was greatly improved and also that no harmful results followed. The opposition countered with the distinction between fluorides which occur naturally, "as God made them," and "man-made," the former being beneficial and the latter harmful.

Meetings galore were held and pros and cons ventilated with vigour and passion. One person who had spoken for fluorination was accosted in the main street as a stinker and a Communist.

A secret ballot was held, before which the newly-formed Anti-fluorination Association bought advertising space in the local paper. A crescendo was achieved the day before the result was declared by the warning that fluorination would produce "a third generation, degenerated to crippled Pygmies." The result was a vote 1,114 to 415 against fluorination. As the author remarks: "It was an authentic social revolt in the pro-fascist pattern."

Advocates suggest that in a few years after emotions have cooled, the issue can be raised again. Opponents reply that fluorination will take place in their town over their dead bodies.

## *Slimming in the Bath*

To impart piquancy to an analytical report is no easy matter, but some items in Mr. H. H. Bagnall's quarterly reports, as City Analyst for Birmingham, exhibit a dry humour delightful to read. His report for the fourth quarter is no exception, as will be seen by his description of a slimming preparation he examined.

"A very remarkable so-called slimming preparation consisted of a white powder which was sold in small paper packets each containing about half an ounce. Instructions were given to dissolve the powder in a bath containing hot water, and then, after washing with soap in the usual way, to lie in the solution for at least 15 minutes. This procedure repeated perseveringly for six weeks was alleged to remove superfluous fat, by precisely what magical process was not stated. In the pamphlet supplied, however, a scheme of dieting was outlined which might have some effect simply because one was advised to avoid certain foods known to be fat forming, but this was given less prominence than the reference to the wonder-working powder.

"The formula for this was given in pseudo-scientific jargon on the back of the packet and, when translated, proved to be a mixture of Epsom salts, Glauber's salt, and common salt in roughly equal parts, together with traces of calcium and magnesium chlorides, potassium iodide and bromide, and iodine as makeweights. The last of these ingredients was not present at all and would have made no difference if it had been, but a delightful air of immense accuracy in dispensing was given by the declaration of the percentages of ingredients to no fewer than four places of decimals. One could not avoid having the conviction that much better results would be obtained by drinking the solution instead of bathing in it."

# Quick Freezing in Ireland

**Just over seven years ago, The National Ice and Cold Storage Co., Ltd., decided to embark on the quick freezing of foods. The rich resources of the fertile lands around Dublin offered fruit and vegetables in abundance, and there were the prawns of Dublin Bay, as well as other fish coming in regularly from nearby harbours. One of the buildings of the N.I.C.S. Company at Sir John Rogerson's Quay, on the banks of the river Liffey, was converted to the needs of quick freezing and its ancillary operations and since the start of these operations, many improvements have been brought about by the installation of new machinery and the development of packaging methods, the constant aim being to reduce production costs and at the same time maintain a high standard of quality.**

IN common with most quick freeze processors, peas form the basic product of this Dublin plant, and the output of this commodity far exceeds that for other produce. Supplementing the crops of their own farms and fields in the northern parts of the county, Ever-Fresh Foods, Ltd., an associated company of the National Ice and Cold Storage Co., handle peas and other produce grown under contract in other parts of the county and also in County Wicklow.

**The freshly harvested pea plants are loaded into the mobile viner.**

### Harvesting the Peas

On the company's own farm at Kinsealey, lorries of 12 ton capacity bring in peas harvested from an area within a five-mile radius, at the rate of one every 20 minutes. This lorry service, originally operated under contract by the Great Northern Railway Company but now jointly run by the Governments of Ireland and Northern Ireland, supplies a continuous shuttle service between the fields and the stationary viner.

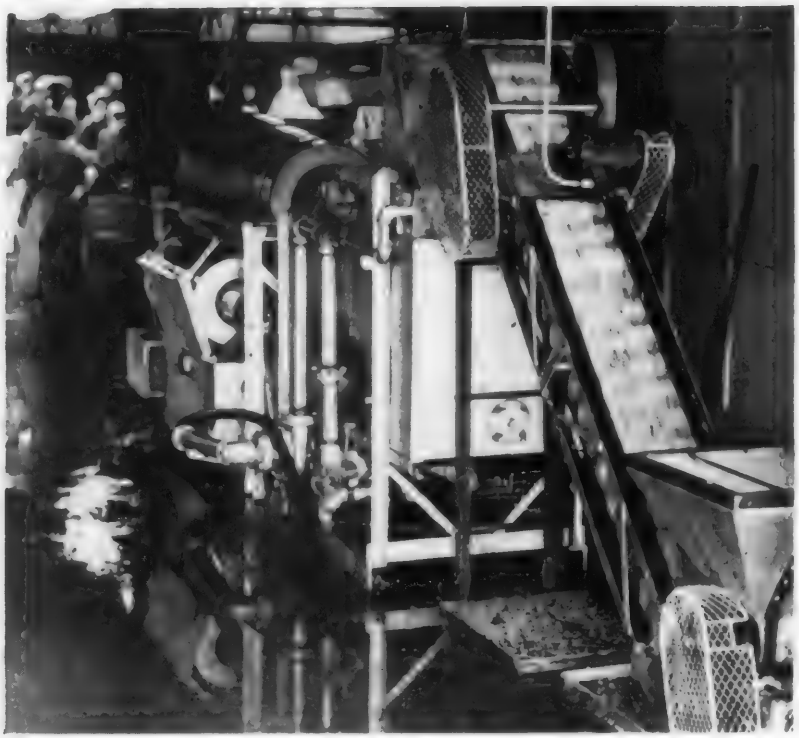
The peas emerge from the viner into wooden boxes, stacked as they are filled for loading on the firm's own lorries for transit to the factory. The haulms are simultaneously collected on a tractor-driven buck-rake and tipped into a silo, constructed of acid-resistant concrete, adjacent to the viner.

The conversion of pea haulms into silage is an important part of the firm's economy, for it provides winter feed for their herd of cattle. It is stated that the vines from one acre of peas provide sufficient feed for two bullocks throughout the winter. In contrast, some East Anglian pea growers are using a combined pea-harvester and viner, which scatters the haulms on the field for ploughing back.

### Mobile Viners

On one farm an American mobile viner is being used, one of the first of its kind to be used on this side of the Atlantic, although mobile viners of British and Belgian manufacture were used during the last pea harvesting season in Norfolk and Lincolnshire.

**The peas are poured into the hopper at the head of the processing line.**



The peas travel up the bucket elevator into a tank of circulating water.

Instead of employing a fleet of lorries to bring the harvested peas to a centrally situated static viner, the company are now able to speed up production and reduce the time-lag between field and factory by threshing the vines in the field where they are harvested. The viner is trailed by a tractor from one field to another as the work proceeds.

The potentialities of the mobile viner are greater on the more widely scattered farms in the Wicklow Mountains, where peas are planted at suitably spaced intervals of time to give a staggered crop. This growing at different altitudes has become a vital part of the company's policy as it expands the pea processing period from something under six weeks to a period varying (according to the weather) from 10 to 12 weeks.

**Factory Operations**

When the peas arrive at the factory, those that have been vined in the field are generally passed through a winnowing machine; those that have been vined on the static machine at the farm, to which a winnower is attached, are tipped straight into a hopper at the head of the processing line.

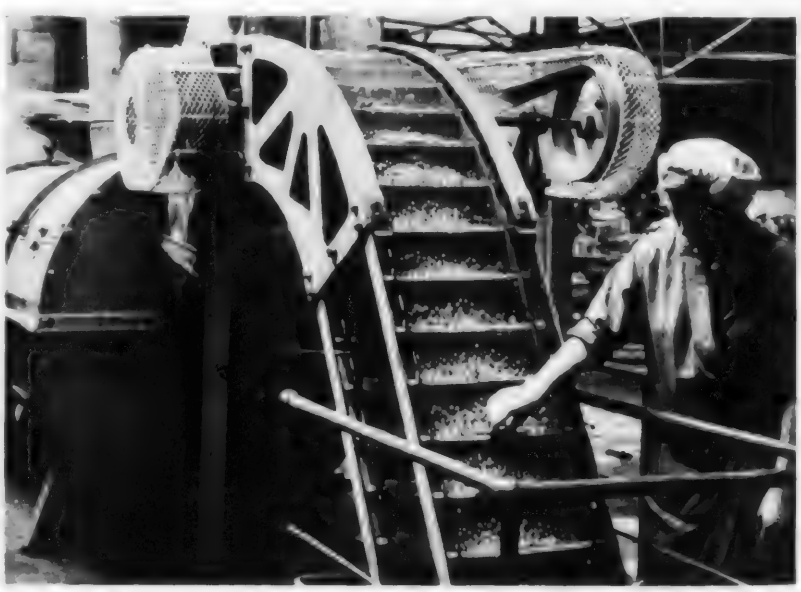
From the hopper, they pass by bucket elevator to a tank of continuously flowing water supplied by a pump immediately beneath. They are then subjected to a second cleaning process under sprays in a revolving drum. From this stage, they are carried by another and longer bucket elevator to the blancher on the first floor.

This arrangement has the advantage of releasing a substantial amount of space on the ground floor, both the blanching and cooling operations being carried on at this higher level. As the peas pass out of the blancher, they are flumed along a 150 ft. length of trough fixed to and following a rectangular route around the ceiling. This ensures the complete cooling of the peas before packaging. During hot weather, when their transit in cool water may not be quite so quickly effective, the peas are also subjected to spraying by means of a hand-operated hose as they pass from the flume into wire baskets, in which they are carried to the packing benches.

**Standardisation of Packaging Methods**

After a long period of experiment with different packaging methods and materials, the company have standardised a fold-over, creased-shoulder type of waxed container for their consumer packs, the makers of which have produced their own heat-sealing machine. This makes possible the permanent heat sealing of the relatively thick, wax-impregnated cartridge paper of which these packs are made.

Lower costs and a saving of time have resulted from the use of these containers, which need neither interior linings of cellulose film nor outer wrappings of waxed paper or transparent film. They



The bucket elevator carries the peas to the blancher.

constitute an adaptation for quick freezing of the tapering sided carton widely used for many different kinds of food products in powdered, granulated, dried, or liquid form.

For quick freezing purposes, two changes have had to be made: the sides have been made vertical so that the base is of the same dimensions as the top, and the fold-over flap which forms the closure is heat sealed and flattened instead of being held by a crimped metal or plastic clip. The filled packs can thus be placed flush side by side and in flat contact with the trays for insertion in the plate freezers.

In addition to being more economical in material, they have the further advantage of being equally well suited for fruit frozen in syrup or sugar.

**Storage Problems**

On the other hand, unlike the tapering sided cartons, they cannot be nested. For despatch to the quick freeze processor in fibreboard cases, as well as for storage on arrival, they take up as much as eight times the space and, unlike the ordinary rectangular box-type cartons with tuck-in lids, they cannot be packed flat for forming into shape on the quick freeze processors' premises.

**After travelling in a cooling flume at ceiling level, the peas pass down the chute into wire baskets.**

**The 2½ lb. catering packs are over-wrapped and heat sealed.**

For catering packs, the company use two kinds of container: a 2½ lb. carton with a cellulose film liner and a 15 lb. case of corrugated fibreboard lined with a bag made of coated paper. The bags are formed by the packaging staff during lulls in processing by heat sealing the material from ready-cut sheets supplied in the size required.

The corrugated fibreboard cases used for this purpose, as well as those used as outers for the consumer packs, can be stacked flat. Similarly, their forming into shape for use can be treated as a "stock job" during the intervals that sometimes occur between the last deliveries of one product and the first consignments of another.

Both air-blast and contact-plate freezers are used in this Dublin plant. One of the former is of unusual construction in that the freezing compartments are on either side of a central gangway,

**The folded over closures of the consumer packs are heat sealed.**

which is kept at a cool temperature. The trucks can, therefore, be pushed into this air-lock, and the prepacked products thus pass through a short pre-cooling stage before they enter the freezer.

Practically the whole of the output of Ever Fresh Foods is exported to England for distribution.

SOME SUPPLIERS OF EQUIPMENT

Pea harvester: *Eastern Counties Farmers' Co-operative Association.*
Mobile viner: *Chisholm Ryder.*
Static viner: *Mather and Platt.*
Waxed cartons and heat sealing device: *Satona.*
Sealing machine for caterers' packs: *Robinson Wax Paper.*
Angle strips: *Dexion.*
British Distributors: *Lovell, Wall and Co.*

## Zinc in Foods

THE Food Standards Committee has considered and adopted a report by its Metallic Contamination Sub-Committee in respect of the limits of zinc in foods.

Zinc, like copper, has a definite physiological function in the human organism and is an essential constituent of an enzyme, which is found in red blood corpuscles and which plays an important part in the transport of carbon dioxide by the blood. Zinc occurs in the liver and spleen to the extent of 50 to 140 p.p.m. and is found in hair, nails, skin, and teeth in amounts up to 200 p.p.m. Small amounts of zinc appear to be necessary for plant growth, but larger concentrations are toxic. Soils may contain from 1 to 5 p.p.m. of zinc and sometimes much more. Sea fish usually have a low zinc content, but very high concentrations (over 1,000 p.p.m.) have been found in oysters.

The normal daily intake of an adult has been estimated at 12 mg. and the amount required to balance metabolic loss appears to be of the order of 10 mg.

At the other extreme, outbreaks of violent vomiting have occurred from eating food prepared in zinc or galvanised iron containers and showing a zinc content to the order of 800 p.p.m., but there are no records of chronic poisoning. The emetic dose of zinc sulphate is shown in the British Pharmacopoeia at 600 to 2,000 mg., but zinc sulphate is rarely, if ever, used for this purpose.

The unsuitability of zinc and galvanised iron containers for storing or cooking food is no doubt widely recognised, but it may be pertinent to point out that outbreaks of poisoning have been attributed to the inadvertent use of galvanised vessels, for example, to drinking rain water collected from galvanised iron roofs or stored in galvanised iron tanks; that acid and saline liquids are particularly corrosive to zinc; and that galvanised iron vessels should not be used in the preparation of foods or for the storage of moist foods. If containers made of "I" sheet zinc are used for the storage of food, a film of zinc oxide may form which is easily detached and may contaminate the food.

Figures of zinc contamination by Port Medical Authorities, public analysts, and food manufacturing firms satisfied the Sub-Committee that public health requirements would be met by observing limits consistent with efficient commercial practice as follows:

| | *p.p.m.* |
|---|---|
| Beverages ready-to-drink .. | 5 |
| Other foods .. .. .. | 50 |

For edible gelatin a maximum of 100 p.p.m. zinc has already been prescribed; apart from this and from the reservation in the next paragraph, the Sub-Committee do not think it should be necessary to provide limits for zinc contamination in other foods in excess of 50 p.p.m.

In view of the high natural zinc content of certain animal and vegetable products, *e.g.* herrings, shell-fish and crustacea, cereal offals and animal offals, etc., no objection should be taken to the sale of such articles containing zinc in excess of 50 p.p.m. if it can be shown that the zinc is of natural occurrence.

In the absence of any new developments, it is not considered necessary to give statutory effect to the limits recommended.

**The Leonard Hill Technical Group**

***Articles published in some of our associate journals in the Leonard Hill Technical Group this month include:***

**World Crops.**—Handling Bananas at the Port of Bristol.

**Building Materials Digest.** Copper and its Functions in Buildings.

**Atomics.**—Nuclear Reactors and Power Production.

**Manufacturing Chemist.**—Paper Chromatography and Electrophoresis.

**Paint Manufacture.** — Protection of Ferrous Metals.

# Vitaminisation of Margarine

**During the First World War most authorities on nutrition regarded margarine as a reasonably good substitute for butter since it provides about the same energy value in the form of fat. Soon after the war ended, the nutritional importance of the fat soluble vitamins A and D became generally recognised. The nutritive value of edible oils and fats could no longer be assessed solely in terms of energy equivalent. Considerable amounts of vitamin A and to a lesser extent of vitamin D were shown to be present in butter, but absent from most of the vegetable oils and fats then being used in margarine manufacture. It was not until the late twenties that the technical difficulties were overcome and it became possible to add vitamins A and D to margarine. By 1939, it was estimated that some 75 per cent. of the branded margarine on sale in this country (representing practically all domestic quality margarine, regardless of price) contained these added vitamins.**

WITH the outbreak of the Second World War, it became apparent that supplies of those foods which were important sources of vitamins A and D in the diet would decrease. In January, 1940, with the support of the Food Rationing (Special Diets) Advisory Committee of the Medical Research Council, the Government decided that in the interests of health all margarine should be adequately vitaminised, a decision which was supported by the Margarine Manufacturers' Association. This requirement has, during control, been imposed as a condition of a licence to manufacture.

Since February, 1940, the vitamin A content of margarine for domestic use has been set at 450-550 international units per ounce (i.u. per oz.) or 16-19 international units per gram (i.u. per g.). For Kosher/vegetarian margarine the level was originally 200-300 i.u. per oz., since this margarine derived its vitamin A content solely from carotene (provitamin A) the addition of which in the full amounts would have produced an unacceptable deep orange colour. Since January, 1952, the use of synthetic vitamin A has enabled Kosher/vegetarian margarine to be vitaminised up to the level of 450-550 i.u. per oz. Part of the vitamin A content of both types of margarine may still be derived from provitamin A.

The level of fortification with vitamin D had, on supply grounds, to be set initially at 30 i.u. per oz. In 1941, it became possible to raise it to 60 i.u. and by 1945, supplies of vitamin D were sufficient to enable it to be raised to 90 i.u. per oz.

When margarine is decontrolled, the existing licensing requirement to add vitamins will lapse. The Food Standards Committee has, therefore, been asked to consider whether it is desirable that vitaminisation should be perpetuated by statutory means; if so, whether the present levels of fortification with vitamins A and D are satisfactory; whether minimum levels or a range should be prescribed; what methods of testing would be appropriate; and what manufacturing and enforcement problems would arise.

### Nutritional Implications

Vitamins A and D are essential nutrients and must be consumed in adequate amounts if good health is to be maintained and malnutrition avoided. Both vitamins are more important during the periods of pregnancy, lactation, and growth, but, although our knowledge of precise requirements is incomplete (particularly in respect of vitamin D) there is no doubt that both vitamins are needed by people of all ages.

The National Food Survey has shown that the present vitaminised margarine is the source of a substantial proportion of the total amounts of both vitamins consumed by the population and is particularly important in the larger families and lower income groups. It is generally recognised by medical and nutritional authorities that the addition of sufficient vitamins A and D to margarine to ensure a satisfactory intake of these vitamins by all sections of the population constitutes an important health measure.

The medical and nutritional advisers of the Ministers of Food and Health are agreed that the vitamin A content of margarine should be approximately equivalent to the level of vitamin A in butter, as offered for retail sale in the United Kingdom. They also consider that the present level of 90 i.u. per oz. for vitamin D has proved satisfactory in practice and that this level should be maintained.

### Trade Evidence

Apart from three companies whose output represents only about 1 to 2 per cent. of the total margarine production, the margarine manufacturers have supported the proposal that vitamins A and D should continue to be added to margarine for domestic use. They felt that no useful purpose would be served by fortifying margarine not intended for domestic use, since it is doubtful whether some forms of vitamin A are stable when subjected to certain processes used in food manufacture.

They accepted the principle that the vitamin A content of margarine should be of the same order as that of butter. They agreed that the level should be prescribed, but suggested that there should be a tolerance to allow for possible losses in vitamin A content between the time of addition by the manufacturers and the time of retail sale. They were of the opinion that the source of vitamin A should not be restricted.

The manufacturers also accepted the present level of fortifi-

*Food Standards Committee, Ministry of Food, Report, February, 1954.*

cation with vitamin D and the use of approved master mixes as a means of adding both vitamins. They considered that the source of vitamin D should not be restricted.

#### Technical Investigations

The Committee has examined figures for the vitamin A content of butter from both published and unpublished data. Since there was some doubt as to the amount in current supplies of butter as offered for retail sale throughout the year, the Committee arranged for the determination of the vitamin A content of a series of samples of summer and winter blended butters. These results showed that the average vitamin A content of butter at the retail stage was about 30 i.u. per g. (850 i.u. per oz.).

If this level were adopted, it would necessitate an increase of about 50 per cent. in the vitamin A added to margarine. The Committee has ascertained that supplies of vitamin A would be adequate to meet such an increase and that the cost of manufacture would not be appreciably affected.

The Committee has also examined evidence regarding the possible loss in the vitamin A content of margarine during manufacture, distribution, and sale. Such evidence indicated that the loss during manufacture was less than 10 per cent. and was subsequently insignificant. Moreover, the Committee understands that, after decontrol, holding stocks of margarine will be considerably reduced and the pre-war practice of quick distribution after manufacture will again be followed.

The vitamin A potency of margarine may be obtained from the vitamin A added as such or its esters and also from carotene (provitamin A). Beta-carotene is converted to vitamin A in the human body to an extent dependent on its method of administration. Following investigations, the Medical Research Council has recommended that when beta-carotene is dissolved in oil a divisor of 1·3 should be used for converting beta-carotene to vitamin A, *i.e.* its vitamin A equivalent should be taken as approximately 0·8 of its weight. Alpha-carotene is equivalent to half its weight of beta-carotene, while the other carotenes are biologically inactive. The beta-carotene equivalent of a mixture of carotenes is, therefore, the sum of its beta-carotene plus one-half of its alpha-carotene. Hence this amount multiplied by 0·8 represents the vitamin A equivalent.

The only source of provitamin A used at present in margarine manufacture is red palm oil, which also acts as a colouring matter. A number of determinations show that the average composition of the total carotenes of red palm oil is 40 per cent. beta-carotene, 27 per cent, alpha-carotene, and 33 per cent. biologically inactive carotenes. Its beta-carotene equivalent is therefore 53·5 per cent. of the total carotenes.

The Committee has considered in detail the available methods of estimation for vitamins A and D. There would be no difficulty in ascertaining whether vitamin A is present in the amount prescribed. As regards vitamin D, the only method so far available is that of biological assay. This is time-consuming and expensive, and few Food and Drugs Authorities could be expected to carry it out at the present time. The Committee has therefore examined the possibilities of the use of an approved master mix, containing the two vitamins in the proper proportions. If such a master mix were added to margarine, the vitamin D content could be deduced from estimations of the vitamin A content of the margarine.

Having considered the above evidence, the Committee is of the opinion that, in the interests of the health of the population, standards should be prescribed for the vitamin A and D contents of domestic margarine by means of a Statutory Instrument.

#### Vitamin Content

The Committee considers that the level of vitamin A in margarine should be equivalent to that of average butter as offered for retail sale, and that the present level of fortification with vitamin D should be maintained.

The Committee considers that a tolerance of ± 10 per cent. should be allowed for both vitamins to cover any unevenness in the mixing and any possible loss in manufacture or storage; further, that the contribution of provitamin A should be taken into account in assessing the total vitamin A content. The Committee does not feel that it is necessary to stipulate the source of vitamins A and D to be used in the fortification of margarine.

#### Scope of the Statutory Instrument

The Committee considers that nutritional needs would be met if vitaminisation were limited to domestic margarine, including that used by caterers and institutions.

Imported domestic margarine should be required to comply with the proposed standards; importers should accordingly be advised to obtain from their suppliers a warranty certifying that the two vitamins have been added in the form of an approved master mix.

#### Use of Master Mix

The Committee is satisfied that a statutory standard for vitamin A content can be enforced provided an approved method of analysis is prescribed. The Committee has ascertained that a suitable method is in fact available.

For the reasons stated above, the Committee considers that the use of a master mix of vitamins A and D in known proportions provides, in present circumstances, the only practicable method of ensuring, for enforcement purposes, the presence of the prescribed quantities of vitamin D.

The Committee consequently considers that the use of a master mix should be made obligatory and that the formula should be subject to the approval of the Minister. Manufacturers of master mixes should be advised to obtain approval before the Order comes into force for any master mix they may wish to supply to margarine manufacturers. The manufacturers of the

mixes would be required to disclose the amount of vitamin A added as such or as its esters, the total amount of carotenes present and their beta-carotene equivalent, and the proportion of total vitamin A to vitamin D. The Committee has been assured by the Margarine Manufacturers' Association that these proposals are acceptable to them.

#### Labelling

The Committee considers that a statement of vitamin contents should continue to appear on the wrappers of margarine; the contents should be stated in international units per ounce as at present.

#### Recommendations

The Committee recommends:

(i) that statutory standards for the vitamin A and D contents of home-produced and imported domestic margarine should be prescribed;

(ii) (*a*) that the vitamin A content should be between 27 and 33 i.u. per g. (760-940 i.u. per oz.) and the vitamin D content between 2·9 and 3·5 i.u. per g. (80-100 i.u. per oz.).

(*b*) that for the purposes of this standard, the vitamin A content should be calculated as the sum of the vitamin A present as such or of its esters plus 0·8 times the beta-carotene equivalent of any carotenes present, alpha-carotene being considered as equivalent to half its weight of beta-carotene;

(*c*) that when red palm oil is used as a source of carotenes, the beta-carotene equivalent should be taken as 53·5 per cent. of the total carotenes;

(iii) that the vitamins should be required to be added in the form of a master mix containing vitamins A and D in known proportions, the composition of each master mix to be subject to the approval of the Minister;

(iv) that the method of analysis for vitamin A should be prescribed by the Minister;

(v) that a statement of the vitamin content in i.u. per oz. should appear on the wrappers of all domestic margarine packed for retail sale.

## Dairy Produce, Meat, and Fruit

THE Commonwealth Economic Committee have recently published three of their annual summaries of food supplies for 1952. In the first of these,[1] dealing with dairy produce, it is stated that, while the output of milk and most milk products in many countries was maintained or increased in 1952, butter production again declined and world butter exports were 30 per cent. below pre-war.

World cheese production continued to increase, although international trade was reduced by the operation of import restrictions and currency problems. In the United Kingdom, the emphasis has been on production of cheese for the ration which, in 1952, equalled the 1950 level of 55,000 tons.

Output of condensed milk in most countries showed a further increase in the year under review and was about 50 per cent. greater than in 1938, while the rise in production of milk powder, particularly in skimmed milk powder, has been greater than for any other dairy product.

Egg production in Western European countries, traditionally the main sources of egg exports, declined sharply in 1951, but in 1952 world exports regained the 1950 level, although they remained about 15 per cent. less than in 1938.

According to the second summary,[2] world meat production rose substantially in 1952 to about 25 per cent. above the pre-war level, but international trade in meat (still about 20 per cent. less than in 1938) was only slightly higher than in 1951, since consumption in most producing countries rose.

Output of beef and veal in Australia, New Zealand, and North America increased appreciably, but production in Argentina declined further, while in the United Kingdom the upward trend was checked. Mutton and lamb output in the main producing countries also rose substantially, while there was a general increase in pig meat production, except in Denmark and the Netherlands.

Trade in canned meat, which had risen appreciably in 1951, showed little change as the reduction in European and South American supplies was offset by the pronounced increase in Australian exports.

Meat consumption in several producing countries where an appreciable decline had been recorded in 1951 recovered in 1952, but in Canada and New Zealand there was a reduction. The figures for Australia and the United Kingdom (on a per head basis) were still much lower than pre-war, but for New Zealand the decline was small. Meat consumption in Argentina, which declined for the third year in succession, fell to the pre-war level. United States meat consumption more than recovered from the fall recorded in 1951 and was 18 lb. per head above the pre-war figure, while in Canada supplies were still 5 lb. higher than in 1938. In the United Kingdom the consumption of all meat, which had fallen by 25 lb. in 1951, rose by 11 lb in 1952 but was still 35 lb. lower than pre-war.

Although the world trade in fresh fruit has not expanded to the same extent as production, it has fully recovered from the setback of the war years. The third summary[3] shows that exports of the principal fruits rose from $5\frac{1}{2}$ million tons in 1951 (which was slightly above pre-war) to $5\frac{3}{4}$ million tons in 1952.

Exports of nearly all the main kinds of fresh fruit entering international trade showed some increase in 1952, the only notable exception being apples, the 1951 exports of which were unusually heavy. World exports of oranges rose slightly to establish a new record at over 20 per cent. above pre-war, and there was a substantial increase in banana exports, which were easily the largest since the war.

Developments in production and trade have been accompanied by increasing fruit consumption in most countries. The United Kingdom, however, in spite of its larger domestic production, still continues to be a notable exception. Fresh fruit consumption in the United Kingdom in 1952, per head of the population, was under

[1] *Dairy Produce*. Pp. 126+xv.
[2] *Meat*. Pp. 107+iv.
[3] *Fruit*. Pp. 159+iv. All published for the Commonwealth Economic Committee by H.M.S.O. Price 5s. each.

65 lb., which is nearly 14 lb., or about 17 per cent., less than the 1934-38 average; the figure for 1951 was 69 lb.

Canned fruit output in the principal countries in 1952 was about 7 per cent. smaller than the record 1951 total. There was some reduction in the Canadian and South African packs, and also in the pineapple pack of Malaya. On the other hand, output in Australia established a new record and production was again heavy in the United Kingdom. Production of most fruits in the United States was lower than in the previous year; but there were larger packs of canned pineapple in Hawaii and other foreign countries.

Dried fruit production generally remained comparatively light in 1952, but there was a marked increase in the world output of dried raisins, owing largely to heavier packs in the United States, the leading source, and Australia.

Wine production, which has been nearly up to pre-war in both 1950 and 1951, fell slightly in 1952 though it was larger than in other post-war years. Yields were somewhat heavier in France and Spain, but these increases were offset by declines in other countries. There was little change in the relatively small output of the two main Commonwealth wine-producing countries, Australia and South Africa, which produced twice as much as before the war.

## Determination of Fluoride

ONE of the three papers presented at the fortieth ordinary meeting of the Physical Methods Group of the Society of Public Analysts and Other Analytical Chemists (now the Society for Analytical Chemistry) was concerned with the polarographic determination of fluoride and was presented by B. J. MacNulty, G. F. Reynolds, and E. A. Terry.

Since it had already been shown that the effect of fluoride on the determination of aluminium was a sound basis for determination of the former, the publication by Willard and Dean of the polarographic method for determining aluminium using pontochrome violet R.S. provided the basis for the polarographic determination of fluoride.

The method consists of measuring the effect of an unknown amount of fluoride on the polarographic step produced from a standard amount of aluminium and dye, and comparing the observed effect with that produced by known quantities of fluoride.

It has been shown, using standard instruments, that the effect of fluoride on the aluminium pontochrome violet polarographic step is quantitative down to 0·1 microgram./ml., while the use of the cathode ray polarograph enables a lower limit for determination of fluoride in water solution of 0·001 microgram./ml. to be reached. In the latter case, it has been found necessary to allow the solutions to stand for 24 hours prior to polarographing in order that the slowly attained equilibria in the solution may be reached, otherwise results are meaningless.

The method has been applied to the determination of fluoride in hydrochloric and hydrobromic acids, and bromine. Impurities which would otherwise interfere with the method are removed by shaking out with acetonyl acetone. In certain cases the minute amounts of impurities still present after shaking out prevent a flat top to the polarographic step being formed; this can be overcome by the addition of a small amount of cadmium.

When using the cathode ray instrument at full sensitivity, considerable trouble was experienced due to vibration of the mercury pool, but the use of an external electrode avoids this.

The other two papers describing the amperometric titration of zinc and its application to the determination of zinc in lubricating oils and a tentative method for the determination of calcium by means of the polarograph were presented by D. Pickles and C. C. Washbrook, and Mrs. Bertha Lamb respectively.

## Malnutrition Explained

SINCE the publication of the Cantor Lectures of 1936 delivered before the Royal Society of Arts by Sir Robert McCarrison, constant reference has been made to them by subsequent writers on nutrition and kindred subjects—a true testimony. The pamphlet in which the lectures were first published having been out of print for some years, it was decided to reprint them in their present form in 1944.

The thesis contained in these lectures that "the greatest single factor in the acquisition and maintenance of good health is perfectly constituted food" is now an established truth. The lectures provide experimental proof of "the fundamental importance of food in relation to health," and their publication should promote the progressive improvement of national diets and health.

The new edition* includes two earlier essays of Sir Robert's, bearing on the subject of his Cantor Lectures, and a postscript on recent advances in nutrition and health, written expressly for the book by Dr. Hugh M. Sinclair. In this postscript, Dr. Sinclair, commenting on the evidence that has accumulated since 1936, says that "16 years is a long time in nutritional research and the advances in this period have been very striking" but that "the new knowledge everywhere supplements—and nowhere cancels—the thesis."

In conclusion he writes: "That this world problem of nutrition is now tackled on an international scale as the result of researches and preaching of men like Sir Robert. . . . Successes already achieved provide abundant hope for the future. But what has already been done is little in comparison with the tasks ahead. To paraphrase the words of the Mixed Committee on Nutrition of the League of Nations, written in 1937: The application of modern knowledge about nutrition has only just begun; it is opening up entirely new perspectives for the improvement of human welfare."

* *Nutrition and Health*. By Sir Robert McCarrison, C.I.E., M.A., M.D., D.Sc., LL.D., F.R.C.P., with postscript by H. M. Sinclair, M.A., D.M., B.Sc. Pp. 125. Faber and Faber. Price 12s. 6d.

# Beet Sugar Refining in the U.S.A.

**Part II**

**In Part I of this article, the operations in a typical beet sugar refining plant were described. The second and final instalment is concerned with the plant characteristics of six U.S. sugar beet processing factories; also described are the ion exchange and Steffen processes and the recovery of monosodium glutamate.**

PLANT A is the smallest refinery of the examples under review, having a slicing capacity under 2,000 tons per 24-hours and employing 173 production workers. Statistics on production, quality of beets, and length of campaign may be found in Table 5.

The plant is one of many under the control of a parent company, as are all other plants in the survey. The parent company performs such functions as administration, sales, and purchasing, in addition to research, standardisation of chemical analysis, and production control.

Research at the plant is directed towards reduction of lime usage, better waste disposal, less scaling, and by-product development. Improvements have been made in methods of trash, mud, and rock handling to overcome problems created by mechanical harvesting. Limitations of the process equipment in handling mud or adobe, however, is one factor controlling the slicing capacity of the refinery.

Higher man-hours per ton than other plants are also shown for the diffusion operation as a result of the older, batch-type process. The weight of the cossettes entering diffusion is calculated from the weight of juice and per cent. of sugar in juice, pulp, and cossettes, using a raw juice scale developed by the company.

Pulp press water is not used in diffusion, nor is an antifoaming agent. Both activated carbon and filter aid are added before thick-juice filtration. The plant has 11 centrifugals which are loaded and discharged manually by four men, while all parts of the cycle are automatically controlled.

All sugar is packed, the packing department operating continuously during the campaign. Packaged sugar is conveyed by inclined belt elevators to the stacking level in the warehouse, which is air conditioned to maintain 60 per cent. maximum humidity.

*Plant B* is of medium size with a slicing capacity of about 3,000 tons per 24 hours. It is the newest plant in the list, and as such has more equipment of later design than the other refineries.

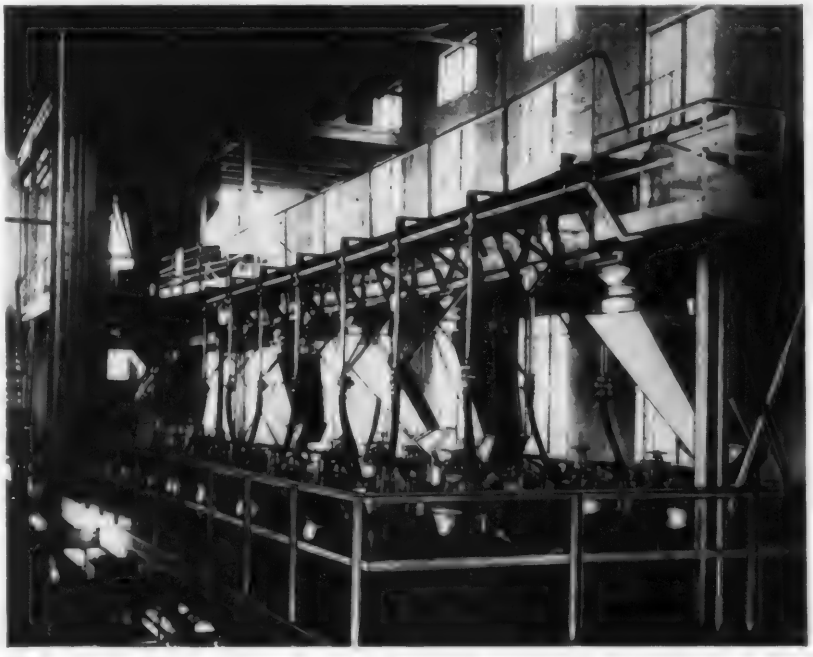
Equipment features in this plant include Silver chain-type continuous diffuser, automatic *p*H and evaporator controls, automatic carbonation end-point control, and automatic (except discharge) centrifugals.

Research at the plant includes methods of disposal of pulp press water, which is being used in diffusion, and laboratory scale study of the ion exchange process. Beets are stored at this plant, as at most of the other plants, in piles over metal ducts with openings through which blowers force air for ventilation.

No antifoaming agent is necessary because of high purity beets. First carbonation juice is filtered on rotary vacuum filters, which require about half an hour for cleaning every eight hours. Only three of the four filters are used at one time. The cloths of the plate and frame presses at second carbonation require about two hours for cleaning every 24 hours.

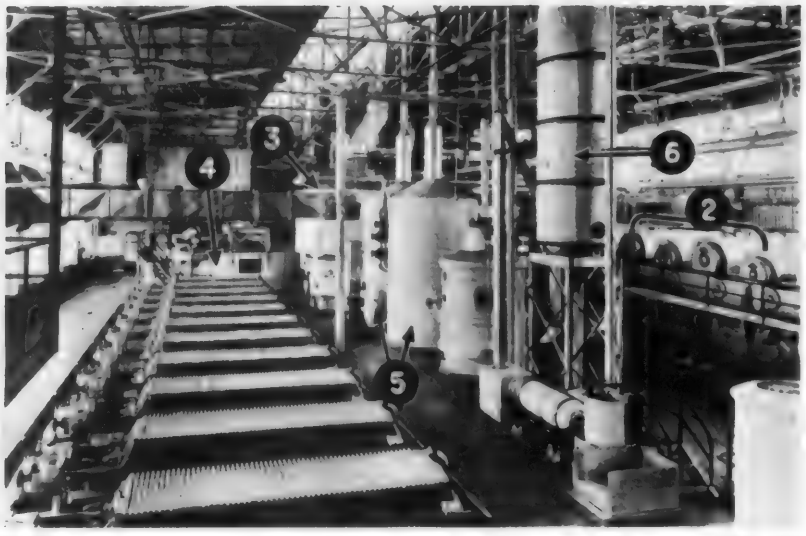
As in most plants, waste water goes to a pond and is later discharged into rivers. Waste lime cake is also pumped to a small pond.

*Plant C* also has a daily slicing capacity of about 3,000 tons per 24 hours. Beets are generally received by truck, stored in unventilated sheds, and carried to the factory by open flumes. Eighty-five per cent. of the flume water is recirculated, whereas between 50 to 60 per cent. is recirculated at Plants A, E, and F. Plants B and D reported none.



**Conventional diffusion battery station with cossette conveyor and distributors.**

Abstract of Case Study Data on Productivity and Factory Performance, prepared for the Mutual Security Agency, Productivity and Technical Assistance Division, by the United States Department of Labour.




**Selected processing units showing Silver continuous diffuser, Benning carbonator (2), Dorr thickener (3), Shriver plate and frame presses (4), second carbonation tanks (5), and sulphur tower (6).**

Handling man-hours were high in 1951 because many beets were received by rail and required piling.

Seventy per cent of the sugar content of the molasses from regular refinery operations is recovered at this plant by the Steffens process. The waste from this process is concentrated and sold for the recovery of monosodium glutamate.

Almost half the sugar produced during the campaign is stored in bulk for packaging between campaigns. This enables the packing, warehousing, and shipping operations to be performed on only one shift, and eliminates the need for precise estimates of amounts and types of packages to fulfil consumer requirements.

The company indicates that for this plant the labour cost (wages paid to production and related workers, excluding administrative, sales, and office personnel) comprises 25 per cent. of total manufacturing cost, and materials 24 per cent.

*Plant D* was erected in the middle 1920's, has a slicing capacity of more than 2,000 tons per 24 hours, and has adopted many of the automatic controls more recently developed. However, it is concluded that the cost of major equipment replacements has prevented this refinery (and others erected before 1940) from installing certain improved methods such as continuous diffusion. As at most of the other refineries, however, the beet piles are ventilated and the warehouse is air conditioned. No utility men were reported for this plant. At other plants such employees work at different operations to relieve regular operators for short rest periods.

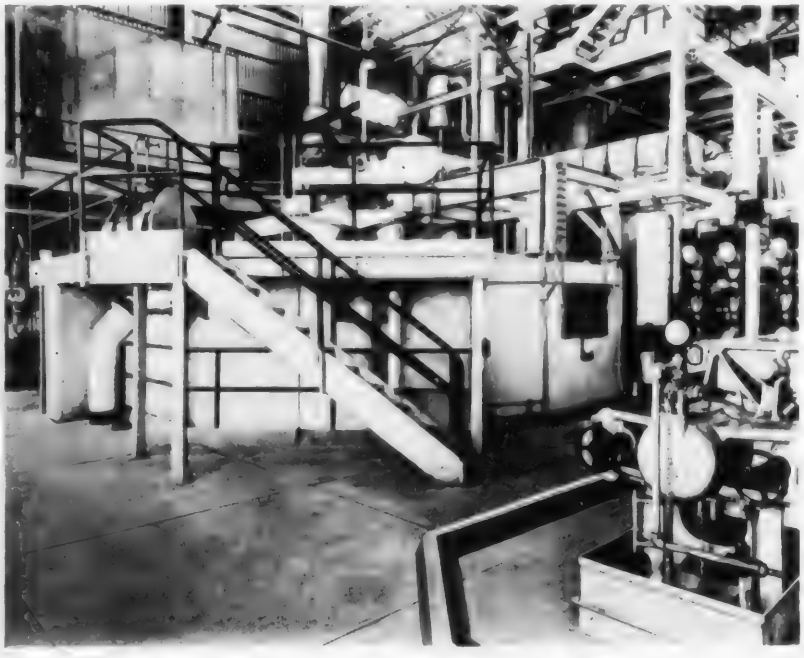
*Plant E* has a slicing capacity of more than 3,000 tons per 24 hours. It has continuous diffusion, many automatic controls, and facilities for mechanised handling and shipping of bulk dry pulp and bulk white sugar. A detailed description of the operations of this plant, whose operations required the least number of man-hours per ton of the surveyed plants, is given earlier in this report.

*Plant F* is the largest refinery of the series. Although the plant has up-to-date continuous diffusion system and also continuous carbonation, much of its equipment is more than 40 years old.

This older equipment, particularly filters and presses, accounts for much of the higher man-hour requirements of this plant. The man-hours devoted to cleaning of filter cloths per 24 hours have been enumerated as follows: six man-hours for four vacuum filters, 10.5 man-hours for one large Kelly press, 18 man-hours for two Sweetland presses, 78 man-hours for six plate and frame presses at first carbonation, 81 man-hours for six plate and frame presses at second carbonation, and 81 man-hours for six plate and frame presses for thin and thick juice carbonation.

Lime cake, which is a waste product at other plants, is processed at this plant for the recovery of lime. During the 1951 campaign, almost 5,000 tons of lime were recovered, reducing requirements of coke by almost 600 tons. The pulp from diffusion is pressed and dried at this plant.

The water from pressing, which is also a waste product at all other plants except Plant B, is clarified



**Dorr multifeed carbonation thickener.**

and used in the Steffens operation to dilute molasses. Approximately 2·1 additional tons of sugar is recovered from every 1,000 tons of pressed pulp water sent to the Steffens process.

#### Machinery and Equipment

Complete information on machinery and equipment was not available from all plants in the sample. However, similar equipment was employed by all plants with few exceptions such as diffusion and filtering.

Information concerning the installation of equipment in more recent years was not available. Such installations, however, have emphasised more automatic operations. This is evidenced by continuous diffusion systems with automatic cossette scales and controls; numerous automatic level, temperature, and *p*H controls; and almost completely automatic centrifugals. Batteries of six centrifugals can now be operated by only two men.

Other additions have provided facilities for handling bulk dry pulp and for the handling and distribution of bulk granulated and liquid sugar. Better packing methods feature the valve-type bag which requires no glueing or sewing.

Research efforts are producing results in reducing the use of lime and filter aids, reducing foaming and scaling, and improving waste disposal and by-product recovery. Increased sugar extraction has been obtained by the return to process of pulp press water and molasses, and from the ion exchange process.

#### Ion Exchange Process

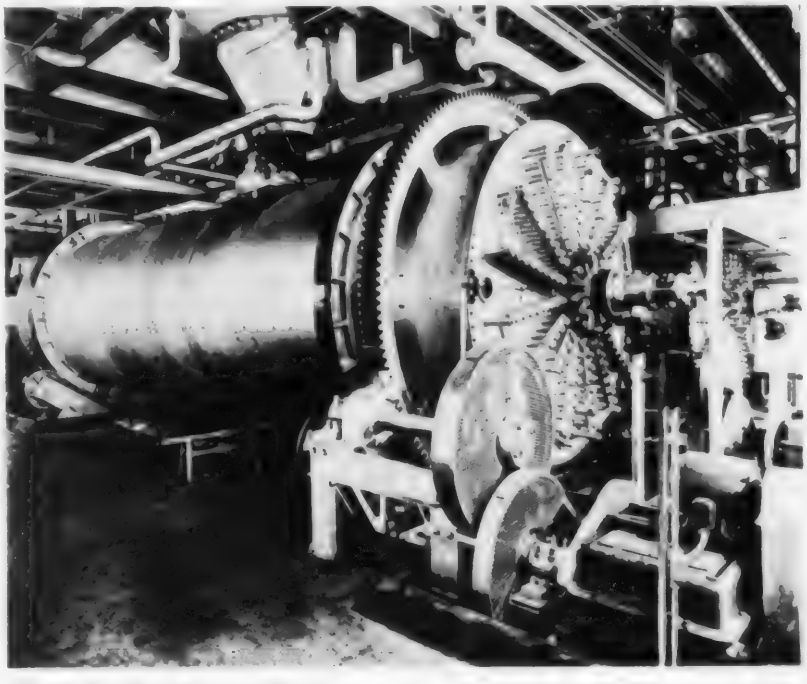
The ion exchange process of juice purification has been tried or proposed for treating diffusion juice, second carbonation juice, green syrups, molasses, and Steffen filtrate. At present three beet sugar refineries are equipped to use this process on second carbonation juice.

In the process, the juice flows through beds of resins of exchangers which remove practically all the salts and many of the organic impurities from the juice before it is boiled. The advantages claimed for this process over conventional methods include increased yields of granulated sugar, with reported extractions up to 93 per cent.; higher purity; better colour removal; lower ash content; crystallisation of two or three "strikes" of white sugar instead of one; elimination of evaporator and pan boil-outs; fewer processing problems; production of edible molasses; and greater potentiality for by-products.

Quintuple effect, calandria type evaporator.

Disadvantages which have limited the wider adoption of the process are the high initial cost of ney equipment, the high costs of the resins and regenerating chemicals, and costs of transportation for the materials.

The equipment of the surveyed plant includes four pairs of tanks with heads designed for a working pressure of 60 p.s.i. The tanks, pipes, and valves are rubber-lined for protection against acid. The



The La Feuille rotary crystalliser.

TABLE 6

COMPARISON OF CONVENTIONAL AND ION EXCHANGE OPERATIONS (PER 24-HOUR DAY) IN BEET SUGAR REFINING, BY SELECTED FACTORS, U.S.A., 1951*

| *Factor* | | | *Type of operation* | |
|---|---|---|---|---|
| *Daily slice* | | | *Conventional* | *Ion exchange* |
| Cossette sugar, tons | | | 1,600 | 1,600 |
| Sugar entering battery, tons | | | 16 | 16 |
| Beet end losses, tons | | | 256 | 256 |
| Per cent. of beets: | | | | |
| Pulp | 0·13 | | | |
| Water | 0·10 | | | |
| Lime flume | 0·02 | | | |
| Unknown | 0·15 | | | |
| Total | 0·40 | | 6·4 | 6·4 |
| Net sugar in thin juice, tons | | | 249·6 | 249·6 |
| Ion exchange loss including sweetening off and inversion, tons | | | .. | 6·0 |
| Sugar to sugar end, tons | | | 249·6 | 243·6 |
| Purity thick juice | | | 90 | 96·5 |
| Purity of molasses | | | 60 | 60 |
| Sugar-end extraction, per cent. | | | 83·3 | 94·5 |
| Sugar bagged, tons | | | 207·9 | 230·2 |
| Sugar in molasses, tons | | | 41·7 | 13·4 |
| Molasses at 50 polarisation, tons | | | 83·4 | 26·8 |
| Extraction, per cent. on sugar in beets | | | 81·2 | 89·9 |
| *Costs* | | | | |
| Labour, 2 men per shift | | | $.. | $60 |
| Regenerants per ton beets: | | | .. | 480 |
| Acid, 20 lb. at 0·015 lb. | | | .. | 480 |
| Ammonia, 6 lb. at 0·05 lb. | | | .. | 10 |
| Fuel, 1 per cent. additional | | | .. | 71 |
| Sugar bags, 446 bags at 0·16 | | | | |
| Total costs | | | .. | $1,101 |
| Credits: | | | | |
| Extra sugar, 446 bags at $6.50 | | | .. | 2,900 |
| Decreased molasses, 56·6 tons at $20 ton | | | 1,132 | |
| Credits minus costs | | | | 667 |
| Return per ton beets | | | | 0·41 |

* Source: Mandru, J. E. (Holly Sugar Corp.) "Ion Exchange in Beet Sugar Manufacture," *Industrial and Engineering Chemistry*, **43**, 615, permission of American Chemical Society, copyright owner.

process is controlled by the push-button operation of switches which open or close the valves. Table 6 indicates the increased extraction of sugar using the ion exchange method and the dollar return from the extra sugar. Costs which are the same for either method used were excluded from the cost balance.

### Steffen Process

Although European beet sugar refineries do not try to recover additional sugar from beet molasses because of its value as a source of alcohol, yeast, and stock feed, this practice, called the Steffen process,* is fairly common in the United States. It consists of adding powdered dry lime (CaO) to the cold (about 12°C.) and diluted (about 6 per cent. sucrose) molasses syrup under agitation.

The lime combines with the sugar to form tricalcium saccharate which precipitates and is filtered. The filtrate is heated and the precipitate removed by settling and filtration. The final filtrate serves as a raw material for the recovery of by-products.

The two filter cakes are dispersed in about 10 per cent. refinery sweetwater, heated and introduced into the factory carbonation with the diffusion juice, replacing the milk of lime used in conventional refineries. The heated saccharate then decomposes to sugar and calcium hydroxide, which serves as the purifying agent for the diffusion juice. In plants where the Steffen process is used the total recovery of sugar from beets sliced is almost 90 per cent.

In one refinery in the United States, the Steffen discard-molasses is subjected to the barium saccharate process, and rotary kilns are used for barium regeneration. The world's principal source of raffinose is crystalised directly from the final molasses in this plant.

The Steffen filtrate, although comprising only about 4 per cent. of total refinery waste volume, is responsible for almost half the biochemical oxygen demand, and as such creates the serious problem of disposal. Some refineries have installed equipment which carbonates and concentrates the filtrate, which is then sold to manufacturers of amino acid products.

### Monosodium Glutamate

Several plants recover monosodium glutamate,* a flavour-accentuating agent, by alkaline hydrolysis of the concentrated Steffen filtrate. After hydrolysis of the filtrate with a 50 per cent. solution of caustic soda, the liquid is partially acidified with hydrochloric acid and again concentrated.

The mixture of hydrochloric and glutamic acids creates a difficult problem of metal corrosion which requires the use of stainless steel or rubber-lined equipment. The concentration results in the crystallisation of inorganic salts which are removed by centrifugal action.

The filtrate is further acidified and the solution crystallised, the latter requiring from five to eight days; the crystals are separated by high-speed centrifugals. The filtrate may be processed to obtain betaine. The crude glutamic acid is then purified, concentrated, crystallised, and centrifuged, producing pure (almost 100 per cent.) monosodium glutamate.

### Production Control

The control of production of granulated and liquid sugar, pulp, molasses, process materials, and by-products is of particular importance in the industry, not only to supply a cumulative account-

* Information on the Steffens process and monosodium glutamate, as well as much valuable background and processing data, was obtained from McGinnis, R. A., *Beet Sugar Technology*, Reinhold Publishing Corp., pp. 135, 477, 481, New York, 1951.

* McGinnis, R. A., *loc. cit.*, pp. 135, 477, and 481.

(*Concluded on page* 154)

# The Vitamins

Progress in 1953

F. A. Robinson, M.Sc.(Tech.), LL.B., F.R.I.C.
*Allen and Hanburys Ltd., Ware, Herts.*

Part II

**In the second part of his review of developments in the field of vitamins during 1953, the author discusses the progress made in elucidating the function of pantothenic acid and the chemical constitution of vitamin $B_{12}$. He also describes the bacterial growth factors, thioctic acid and orotic acid.**

IN last year's review, the relationship between pantothenic aci, coendyzme A, and the *Lactobacillus bulgaricus* factor (LBF) was discussed, coenzyme A being referred to as the catalyst of acetyl transfer. It now seems that its function is a much wider one, that of transferring acyl groups in general. The acetoacetyl, crotonyl, succinyl, benzoyl, and palmityl derivatives of coenzyme A have been synthesised[54] and in many instances these substances have been shown to be intermediates in enzyme reactions.

Coenzyme A has been purified by ion exchange chromatography giving a product estimated to be 50 to 65 per cent. pure[55] while the *Lactobacillus bulgaricus* factor was isolated from the culture filtrate of *Ashbya gossypii* and shown to have properties similar to synthetic pantethine [the sulphide of N-(pantothenyl)-β-mercaptoethylamine] and a product obtained by treatment of coenzyme A with intestinal phosphatase.[56]

Two other degradation products of coenzyme A, pantetheine-2′ : 4′ hydrogen phosphate and pantetheine 4′ dihydrogen phosphate, have been synthesised[57]; the latter was converted into coenzyme A by a pigeon liver enzyme and adenosine triphosphate.

A colorimetric method of estimating pantothenic acid has been described[58] based on the formation of a greenish yellow colour by the action of 2 : 7-naphthalenediol on the dihydroxy acid produced by hydrolysis. Many other substances interfere, thus limiting the usefulness of the method.

Pantothenic acid can be liberated from tissues most effectively by digestion with a hog kidney extract itself freed from pantothenic acid by treatment with Dowex.[59] Higher values have been obtained for various animal tissues by this method than any previously recorded. Liver, kidney, and pancreas from pigs sheep and ox contained 30 to 80 μg. per g., heart and brain 20 to 30 μg. per g., lung and spleen about 10μg. per g. and muscle about 5 μg. per g. The levels of pantothenic acid in the blood can be increased by administering benemid, which inhibits tubular secretion by the kidney.[60]

### Biotin and Biocytin

Biotin does not appear to be of much importance in human nutrition, and the only papers published in recent years have been concerned with its importance as a growth factor for micro-organisms and with the chemical structure of the bound form of biotin known as biocytin which occurs in yeast. This has been shown by degradation and synthesis to be ε-N-biotinyl-L-lysine.[61]

### Folic Acid and *in vivo* Methylation

One or two publications and patents have appeared[62] on the preparation of pteroylglutamic acid and related compounds; some of the methods described are novel. The main interest in the biological properties of folic acid now lies in the microbiological field, but some attention is still being paid to the role of folic acid in the animal. It has been confirmed,[63] for example, that folic acid-deficient rats lack the ability of normal rats to methylate nicotinamide and the defect was remedied by injection of folic acid but not citrovorum factor.

Vitamin $B_{12}$ deficiency also reduced the excretion of $N^1$-methyl-nicotinamide, but the administration of vitamin $B_{12}$ did not produce any effect until a week later. Folic acid deficiency also resulted in a reduction of the coenzyme A content of the liver in chickens[64] and choline oxidase activity of the liver mitochondria in rats.[65]

It has been suggested[66] that values lower than 30 per cent. for the urinary excretion of folic acid following a test dose of 5 mg. may be indicative of malignancy, provided megaloblastic anaemia, malabsorption, oedema, and severe infection of long duration are absent. The symptoms of folic acid deficiency in the duck[67] and guinea-pig[68] have been described. Scurvy caused an increased requirement for folic acid in the monkey.[69]

Fresh eggs contain on an average 4·6 μg. of folic acid, 0·5 μg. in the white and 4·1 μg. in the yolk.[70] The low solubility of folic acid in water, except at high *p*H values, has hitherto prevented its use in parenteral solutions in association with vitamin $B_{12}$ which has its optimum solubility at *p*H 4·0 to 6·5. It has now been found[71] that the solubility of folic acid at *p*H 6·0 to 6·5 can be increased by glycine, methylglucamine, or nicotinamide. There is no loss of potency on storage.

### Citrovorum Factor

Some of the folic acid present in animal tissues occurs in the form of the citrovorum factor and the two substances can be distinguished from one another by their different effects on *Leuconostoc citrovorum* and *Streptococcus faecalis* R and by chromatography.[72] The proportion of total folic acid activity attributable to citrovorum factor varies in different tissues from 10 per cent. in beef, liver, and kidney, to 70 per cent. in spleen and heart.[73] The liver appears to be the main site of the conversion of pteroyl-



[G]

glutamic acid to citrovorum factor.[74] Citrovorum factor is also formed from folic acid by certain bacteria,[75] and aminopterin interferes with this conversion.

### The Vitamin $B_{12}$ Complex

No further progress appears to have been made in elucidating the chemical constitution of vitamin $B_{12}$ although further degradation studies have been reported and the structures of certain of the degradation products have been confirmed by synthesis.[76] Vitamin $B_{12}$ is synthesised by *Rhizobium meliloti* and *Bacillus megatherium*, as well as by various species of *Streptomyces*.[77] Several patents relating to the biosynthesis and extraction of vitamin $B_{12}$ have been published[78] and others relating to the formation of vitamin $B_{12}$ (cyano-cobalamin) from vitamin $B_{12b}$ (hydroxo-cobalamin) by treatment with cyanide.[79]

The relationship between the various forms of vitamin $B_{12}$ has received further attention and the presence of these and of other growth factors in liver extracts and fermentation products has made the estimation of vitamin $B_{12}$ in such preparations a matter of unusual difficulty. Vitamin $B_{12f}$, isolated from rat faeces, has been shown[80] to be a cyanide complex, probably identical with pseudovitamin $B_{12}$ which contains adenine in place of the dimethylbenzimidazole portion of the vitamin $B_{12}$ molecule.

Although it stimulates the growth of bacteria, it has no growth-promoting action on rats or chicks. It appears to be absent from liver extracts, but a similar substance was excreted in the faeces of the cow, sheep, pig, horse, chicken, guinea-pig, and man. Vitamin $B_{12}$ and substances similar to it can be separated from one another by ionophoresis and identified by their effects on suitable micro-organisms.[81] It was possible in this way to demonstrate the similarity of the so-called factor A and vitamin $B_{12m}$ and that of pseudovitamin $B_{12}$ and vitamin $B_{12f}$, and to differentiate both from vitamin $B_{12}$, factor B and factor C. Wijmenga's factor WR contained vitamin $B_{12}$, psuedovitamin $B_{12}$, vitamin $B_{12f}$, and factors B and C. The method is considered to be much more selective than chromatography.

### Estimation of Vitamin $B_{12}$

Probably the most widely used method of estimating vitamin $B_{12}$ is by microbiological assay with *Lactobacillus leichmannii* or a mutant of *Escherichia coli*. A six-point design has been adopted by the U.S.P.[82] The presence of the growth factors referred to above complicates the interpretation of the results obtained by this method unless the interfering substances are first removed. Hydroxo-cobalamin (vitamin $B_{12b}$) should either be converted to the cyano-form by treatment with cyanide, since the two substances do not behave similarly in plate assays,[83] or else be destroyed by treatment with ascorbic acid.[84]

The existence of alkali-stable factors first reported by Robinson *et al.* and their interference with the microbiological assay of vitamin $B_{12}$ has been confirmed.[85] Attempts are being made to devise satisfactory chemical or physico-chemical methods of assay, such as spectrophotometric methods.[84 86]

### Vitamin $B_{12}$ and Anaemia

Solutions of vitamin $B_{12}$ or purified liver extracts are the standard treatment for pernicious anaemia. Such solutions are stable for long periods provided they are not exposed to air[87] or light.[84] Exposure to light is said to result in the conversion of cyano- into hydroxo-cobalamin, but the change may be reversed on storage in the dark. Estimates of the amount of vitamin $B_{12}$ necessary to maintain pernicious anaemia patients in good health vary a good deal, but a recent estimate[88] suggests a figure of about 1 $\mu$g. per day given intramuscularly at intervals of three or four weeks. Neither vitamin $B_{12}$ nor purified liver extract nor folic acid singly or in combination was entirely satisfactory for adequate maintenance, suggesting that some other substance or substances may be necessary. Even less satisfactory results were obtained with vitamin $B_{12}$ in the maintenance of patients with nutritional macrocytic anaemia although the initial improvement in the majority of cases was satisfactory.[89] Crude liver extract on the other hand gave a sustained response.

There is still no satisfactory explanation of the way in which vitamin $B_{12}$ acts in preventing anaemia or in curing patients with pernicious anaemia, although there is plenty of additional evidence in support of its association with the methylation processes of the body, already referred to above. Thus in the presence of vitamin $B_{12}$, both choline and homocysteine increased the growth rate of chicks or young turkeys on a diet low in methylating substances.[90] Methyl groups formed mainly from the hydroxymethyl group of serine, and to some extent from formate, are first incorporated into methionine and then transferred to choline by transmethylation.[91] Vitamin $B_{12}$ increased both the conversion of the precursors into the methyl groups of methionine and their transfer to choline.

A vitamin $B_{12}$-deficiency in the rat produces a marked reduction in the liver xanthine oxidase and betaine-homocysteine transmethylase activities,[92] whereas the effect on xanthine oxidase was indirect. The transmethylase activity responded completely to a single injection of vitamin $B_{12}$. Vitamin $B_{12}$ also appears to be concerned in the formation of the methyl group in adrenaline.[93] Vitamin $B_{12}$-deficiency reduced plasma proteins and increased the prothrombin times in chicks[94] and reduced the amount of glutathione in the blood of rats and humans,[95] while administration of vitamin $B_{12}$ increased the tensile strength of wounds during the early phases of healing in rats fed balanced diets.[96]

### Intrinsic Factor

One of the most active fields under investigation at present is that concerned with the nature of the "intrinsic factor." Many years ago, Castle suggested that the stomach contains an intrinsic factor which reacts with an extrinsic factor present in food forming a complex that promotes reticulocytosis. A deficiency of either factor results in pernicious anaemia which could be cured by administration of the missing fac-

tor. Castle's theory is now widely accepted, with vitamin $B_{12}$ in the role of extrinsic factor. It is believed that this, with the intrinsic factor, forms a complex in which state the vitamin is protected from destruction by intestinal bacteria, and thus is capable of being absorbed into the systemic circulation and utilised for reticulocyte formation.

It is well known that whereas vitamin $B_{12}$ is inactive when given by mouth, mixtures of liver extract and stomach extract are effective in pernicious anaemia when given orally, and a patent has been granted covering a combination of vitamin $B_{12}$ and duodenal mucosa for this purpose.[97]

A great deal of work is at present being carried out on the nature of the vitamin $B_{12}$-binding factor, and it has been shown that the distribution of the binding factor in the various gastric and intestinal areas of the pyloric mucosa corresponds with the distribution of Castle's intrinsic factor.[98] The vitamin $B_{12}$-binding substance in hog duodenal extract was separated from other protein constituents by electrophoresis,[99] while the factor in concentrated human gastric juice was separated from the proteins by paper electrophoresis.[100]

A concentrate similar to the intrinsic factor has been prepared from sow's whey; both substances bind not only vitamin $B_{12}$, but also the vitamin $B_{12}$-like compounds, factors A and B and pseudo-vitamin $B_{12}$.[101]

#### Thioctic Acid and Orotic Acid

In last year's review it was reported that $\alpha$-lipoic acid, a bacterial growth factor also known as protogen, had been shown to be dithiacyclohexane-6-butyric acid and had been re-named thioctic acid. The method of isolating it from acid-hydrolysed liver residues has now been described[102] and involves a 300,000- to 600,000-fold concentration.

A compound with properties similar to those of thioctic acid was synthesised by iodine oxidation of 5 : 8-dimercapto octanoic acid, thus confirming the suggested constitution.[103] A related substance with similar biological properties appears to be an oxidation product of thioctic acid, possibly a sulphoxide.[104] The 4- and 5-isomers of thioctic acid have scarcely any biological activity.[105]

It was also reported that a conjugate of thioctic acid containing thiamine is required for the oxidative decarboxylation of pyruvate and $\alpha$-ketoglutarate. It has now been shown that a cell-free extract from a particular strain of *E. coli* can convert thioctic acid and thiamine pyrophosphate into the conjugate[106] and that biologically active substances were formed when thioctic acid or its acid chloride was reacted with thiamine or its phosphates.[107] The co-enzyme is probably the thioctic acid amide of thiamine pyrophosphate but it has not yet been shown to be present in animal tissues.

Another bacterial growth factor which has received some attention during the year and which may now justify inclusion in the list of vitamins, since it has been shown to be a growth factor for mice, is orotic acid,[108] uracil-4-carboxylic acid. It has been isolated from cow's milk,[108, 109] but only small amounts are present in human milk. It is apparently related to the so-called vitamin $B_{13}$.[110] An enzyme which converts it into dihydro-orotic acid has been isolated from a soil bacterium,[111] but the significance of this discovery is not yet clear.

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(*Concluded on page* 156)

# Food Research

An entirely new set of topics has been selected for inclusion in the fourth* of the series of reports on progress in food research, among which may be mentioned chlorophyll, the importance of which to the research worker in food chemistry arises from three sources: (*a*) the degradation of chlorophyll during food processing; (*b*) its fate in biological systems; and (*c*) its possible utilisation as a raw material for industrial and pharmacological purposes. In his review, S. Aronoff discusses all these points.

Wiltshire bacon, a type of product produced from whole pork sides, is dealt with by N. E. Gibbons, who emphasises the importance of the treatment of the hog prior to slaughtering on bacon quality. He also discusses quality criteria and post-slaughter treatment of the carcass as an influence on quality.

In his review of the design of work methods, L. E. Davis shows how hand operations can be simplified and efficiency increased. Some of the procedures outlined, for example those which have been shown to lend themselves to the handling of raw materials prior to processing, harvesting fruit and vegetable products, as well as operations in the food processing plant, have already been applied to the handling of food products with excellent results.

When the concept of nutritional stress factors was first introduced, it was usually related to environmental effects. It has now been ascertained that certain stresses may result from the composition of the dietary itself. S. Lepkovsky, in his contribution, points out that processing and storage as well as other food factors also induce stress. For example, it is conceivable that the reversion of edible fats or the effect of heat on the nutritive value of protein might well induce a stress. These two latter topics form the subject of reviews by B. F. Daubert and P. W. O'Connell, and E. E. Rice and J. F. Beuk respectively.

An explanation of how millions of people living in south-east Asia provide themselves with high quality fish protein is given by A. G. van Veen, who describes methods of preparing fish sauce, fish paste, salted fish, and other fish products.

A condensed but complete account of progress in the control of insects in food products is given by A. E. Michelbacher, whose contribution includes accounts of the life history and development of these insects, types of material they attack, the influence of the physical condition of the products on attack, the manner in which products become infested, and the influence of food requirement, temperature, light, population density, and natural enemies.

The 23 pages of references at the conclusion of the chapter on the use of ascorbic acid in the processing of foods bear witness to the extensive scientific literature covering its use in food. The task of reviewing this has ben admirably achieved by J. C. Bauernfeind. He discusses the uses of ascorbic acid in connexion with oxidative browning in heat processed foods, flavour and nutritional value in juices, enzyme-catalysed oxidations in frozen foods, and the oxidation of fats, fish, meat, dairy products, and beverages.

This latest volume of the series carries on the scheme of the editors to provide an all-inclusive covering of progress in food research, and maintains the high standard of the previous volumes. Its wide range should ensure the interest of those engaged in most branches of the food industry. Not the least valuable of its features are the comprehensive bibliographies which accompany each section.

* *Advances in Food Research.* Vol. IV. Edited by E. M. Mrak and G. F. Stewart. Pp. 457 + xiii. Academic Press. Price $9.

## Fruit and Vegetable Juices

Twenty outstanding specialists in food research have collaborated with Drs. Tressler and Joslyn to produce a book* concerned with the American fruit and vegetable juice industry.

Fifteen years have elapsed since the publication of "Fruit and Vegetable Juices," during which time the advances made in the technology of the preparation, preservation, concentration, and utilisation of juices have made it necessary to include much additional material in the new work. In 1939, for example, H.T.S.T. and flash pasteurisation methods were just coming into use; today their use in the fruit juice industry is almost universal. Dried fruit juices were unknown and, during the past 15 years, the production of frozen fruit concentrates and the separation and concentration of volatile flavours of fruit (fruit essences) have been perfected.

These are only a few instances of the achievements of the industry recorded in the book and all those engaged in the manufacture and preservation of fruit and vegetable juices will find, in addition, the latest information concerning the chemistry and technology of these products.

Other food manufacturers who will find much of interest will be those concerned with the production of jelly, jam, soft drinks, and ice creams since the book contains much useful data concerning the uses and properties of all fruit and vegetable juices packed commercially.

Further information on any of the subjects dealt with is readily ascertained by reference to the comprehensive bibliography which concludes each chapter of the book, most of which refer to articles and papers published since 1938. As an illustration of completeness of this bibliography, there are no less than six pages of references at the conclusion of the second chapter on the preparation of fruit and vegetable juices.

As an authoritative treatise concerning one of the most important and rapid growing of the food industries, this book deserves every recommendation.

* *Fruit and Vegetable Juice Production.* By Donald K. Tressler, Ph.D., and Maynard A. Joslyn, M.S., Ph.D. Pp. 962 + xix. Avi Publishing Co. Price $15

# The Passion Fruit

H. P. Mollenhauer

**This survey of present published knowled ge about passion fruit (*Passiflora edulis* Sims) covers the history of the plant, its botany, cultivation, and processing. Special emphasis is laid on the commercial aspects, and suggestions are made relating to the possible utilisation of passion fruit seeds and shells which at present are discarded.**

THE passion fruit belongs to the family *Passifloraceae* which comprises some 300 members in the genus. Besides *Passiflora edulis*, the purple passion fruit, there are a large number of others of interest as fruit bearing plants,[1, 2]

### Structure of the Fruit

The purple passion fruit—as all other "passion fruits"—is a berry, being a fruit "in which all the layers of the pericarp become succulent; when at complete maturity the succulent tissue dries up, a dry berry results."[3] The seeds of the passion fruit are surrounded by a sac-like juicy arillus, an expansion of the funiculus arising from the placenta and enveloping the seed.

Another example is the fruit of *Myristica* (nutmeg) containing a fleshy arillus which when separated, dried, and powdered is known commercially as mace.

Macroscopically the passion fruit looks like a big dark plum, the diameter being between 1 and 3 in. The rind is externally covered with a thin layer of wax. In the microstructure of the rind is a layer of five rows of stone cells, which gives it a rather tough texture. The fresh fruits are oval shaped, smooth, and of a slightly glossy dark purple colour. However, soon after maturity they begin to shrivel and shrink.

The cavity inside is filled completely with the juicy arilli embedding the black seeds. The seeds are about ¼ in. long, lenticular, and when dry show small cavities all over the surface. The endosperm contains two cotyledons rich in oil.

A detailed anatomic microscopic analysis may be found in Winton.[4]

The passion fruit is a native of Southern Brazil,[5] where it attracted the interest of the Spanish conquerors early in the 16th century. The Spanish friars saw emblems of the Passion of Christ in different parts of the flower and named it *Flor de las cinco llagas* (flower of the five wounds) or *flos passionis*. They regarded it as a heavenly sign to convert the "Indians" of the country to Christianity.

Today, about 400 years after its discovery by Europeans, the passion fruit is grown in practically every country with a suitable climate. In South Africa, for

**Symbolical drawing from Parkinson, "Paradisus in Sole," 1629.**

example,[6] it is grown commercially on a large scale in the Eastern Transvaal and to a smaller extent in the Western Cape Province. During the seasons 1949-1950, the total crop of the Union increased from 2,000 to 4,000 tons, of which about 600 tons are sold yearly as fresh fruit, the balance being used for pulp.

The price of passion fruit pulp was quoted in London in 1936 at 5s.,[7] and in Australia in 1952 at 57s., per gallon.[8]

The cultivation of the plant is comparatively simple and it can be a profitable cropper in sub-tropical climates. In Australia, passion fruit is grown successfully down to the 38th Parallel, and *Tacsonia* (the banana passion fruit) as far south as Tasmania. It is suitable for the warmer regions of the Mediterranean climate, as mild frosts are not harmful.[9]

The plant usually bears two crops yearly, the winter one being more prone to attack by disease. When planting is done in the spring, the first crop may be expected after 15 months; with autumn planting, after 18 months.

### Processing Operations

The processing of passion fruit is fairly well mechanised and involves the following steps:

1. Sorting, washing, and sterilising.
2. Cutting open the shells.
3. Recovering the pulp.
4. Separating seeds and pulp.
5. Utilising the seeds.
6. Utilising the shells.

So far as the author's knowledge goes, steps 5 and 6 are not carried out in the Australian industry at present. The seeds, if not left in the pulp, are discarded as also are the shells.

In small scale production, the fruits are cut in halves by hand, the fruit being held between the thumb and index finger, between which a sharp knife is drawn. This way of cutting is important as it is an easy matter for the knife to slip on the woody stone cell tissue of the shell, and cut the hands of the operator. After cutting, the pulp is removed by spoon and placed in a vessel.

According to Kefford,[10] mechanical extraction by crushing the whole fruit is being developed,

Sims drawing of the passion fruit from "Curtis's Botanical Magazine."

but whatever method is used, mechanical or otherwise, it is essential that dirt from the outside of the shell does not contaminate the pulp of the cut fruit.

More often than not, fruit delivered by the grower is heavily infested with dirt and soil, but a short passage through boiling water, steam, or a chlorine solution, followed by a cold water rinse will, for all practical purposes, sterilise the outside of the fruits. The short heat treatment also loosens the pulp, thus facilitating the subsequent operation.

**Canning of Pulp and Juice**

Available data on the time and temperature used in the canning of the pulp vary considerably. According to one author,[11] the pulp should be heated to 180°F., and held for 20 minutes, while another[12] suggests 190°F. for 30 minutes.

To be successful, the canning of pulp and juice must be carried out in small containers; as the product is extremely susceptible to loss of quality by heating, excessive heat treatment resulting from slow heat penetration in large packs would spoil the pack. The following procedure is suggested for canning juice:[13] open cans of juice are heated for two minutes to 120°F.; they are then closed and processed for eight minutes at 176°F.

Recent research carried out by C.S.I.R.O.[10] has revealed that the processing time can be reduced if the cans are rotated axially at 140 r.p.m. It is recommended that No. 1 tall cans be processed for 1½ minutes and No. 10 cans for four minutes, during which the centre temperatures reach 170° to 180°F. After heating, the cans are exposed to cold water sprays while still rotating. Apart from possessing a slight cooked flavour, the product was reported to be satisfactory.

The author believes that pasteurisation is rendered more efficient when the pulp is free from seeds as it is possible that their presence in the pulp may cause the lowering of the heat penetration rate. The above-recommended temperatures are certainly not high enough to pasteurise the inside of the seeds.

Flash pasteurisation of the pulp or juice is considerably hampered by the fact that the starch of the juice gelatinises, making it very viscous.

For bulk supplies, seedless and heat-treated chemically preserved pulp is usually shipped in wooden casks, but this is generally lacking in flavour.

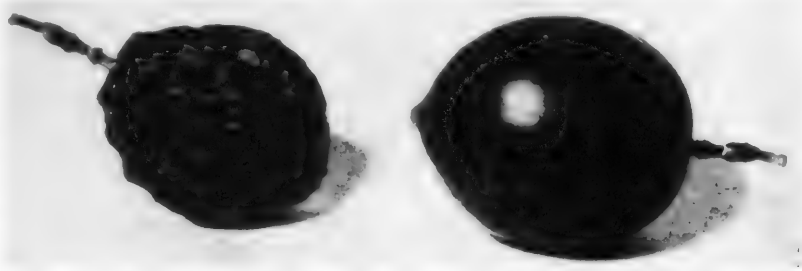
Information on the subject of cold storage also varies. According to Savage and Ramsay,[14] the juice keeps for four weeks at 36°F. and for seven weeks at 10°F. On the other hand, Williams[15] states that the keeping time is 12 weeks at 36°F., and indefinite at 10°F. According to yet another source[16] the keeping time at 25°F. is indefinite.

American workers suggest mixing the pulp with an equal amount of sugar syrup to improve keeping quality during storage.[13, 17, 18, 19]

It is generally believed that the whole fruit cannot be kept longer than one to two weeks under normal conditions, and even cool storage is not very promising. Temperatures below 40°F. are said to be detrimental, leading to low temperature breakdown followed by mould attack. The fruit can be held for four to five weeks at 40° to 50°F., although its good appearance after this time is misleading, as the flavour vanishes after the fruit is held for this period.[20]

A shipment of whole fruit involving a voyage of six to twelve weeks was made from Australia to San Francisco under normal temperature to test the validity of the general belief that whole fruit could not be kept for longer than one or two weeks.[12] The consignment was shipped in three different packs: one in ordinary paper, another in waxed paper, and a third in cork dust. It was found that the lot packed in waxed paper arrived in a much better condition than the others.

According to experiments carried out by the author, dipping the fruit in hot paraffin wax gave promising results. The hot wax sterilised the surface and prevented the drying out and shrivelling of the fruit. Furthermore, the high glossy transparent wax film made the purple fruit very attractive. After two to three months, the waxed fruit had a good appearance and was gener-



Two fruits after three months' storage at ordinary room temperature, one treated with wax (*right*) and the other untreated.

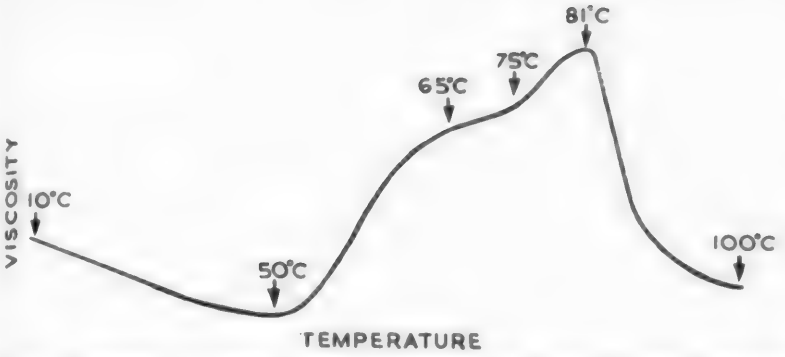



**Fig 1. Diagrammatic representation of the viscosity/heat relation in natural fruit juice at a *p*H of 3·2.**

ally in good condition, but the flavour had begun to deteriorate. This loss of flavour may be largely attributed to the evaporation of the volatile components through the wax film. Present experiments concern the finding of a suitable plastic film, less permeable than the wax, which could be used for coating the fruit.

### Chemical and Physical Properties of the Pulp

As previously mentioned, the pulp consists of the juicy arillus tissue and the black seeds. The colour is generally yellowish-orange, sometimes a little more reddish, depending on the state of maturity and the method of processing. By exposing the fruit to heat, more or less of the purple colour of the shell can be made to penetrate into the pulp.

The viscosity of the raw pulp, after separating from the seeds, differs little from that of a sugar solution of similar concentration. After a short time of standing, the juice separates from a voluminous sediment which shows white layers of deposited starch among more loosely settled yellow tissue particles. The seeds are rather brittle and are easy to bite.

The chemical composition of the pulp shows wide variations because the fruit tends to dry out. Qualitatively, the juice has a composition similar to that of other fruit juices. The flavour is very pronounced and pleasant, resembling a blend of strawberry and pineapple with a dash of peach. According to Poore,[13] it has been likened to a combination of pineapple, guava, mango, apricot, and strawberry. The volatile bouquet is strong and fragrant. The sugar content varies between 10 and 15 per cent., and the total acidity calculated as citric acid between 2·3 and 3·5 per cent. The *p*H of American fruit, based on a single test, was found to be 3·4.[21] The *p*H of Australian fruit appears to be somewhat lower, in one case being 3·1.

According to Jewell,[22] the chemical composition of the Australian fruit is:

| | *Pulp with Seeds per cent.* |
|---|---|
| Moisture ... ... ... | 70·4 |
| Ash ... ... ... | 0·7 |
| Protein ... ... | 2·9 |
| Fat ... ... ... | 2·1 |
| Fibre ... ... ... | 7·7 |
| Acid (as citric) ... | 2·8 |
| Invert sugar ... ... | 7·6 |
| Sucrose ... ... | 1·6 |
| Starch (by difference) | 4·2 |

Pope[23] found the following composition of Hawaiian fruit:

| | *per cent.* |
|---|---|
| Ash ... ... ... | 0·48 |
| Acid ... ... | 2·30 |
| Carbohydrates ... | 19·10 |

The composition of the passion fruit seed oil has been investigated by British and Japanese workers.[21-26] The oil yield is stated to be 20 per cent. of a drying oil, containing 11·5 per cent. solid fatty acids and 88·5 per cent. liquid fatty acids. The amounts of the individual fatty acids as glycerides are:[27]

| | *per cent.* |
|---|---|
| Oleic ... ... ... | 19·9 |
| Linoleic ... ... | 62·3 |
| Linolenic ... ... | 5·6 |
| Palmitic ... ... | 7·1 |
| Stearic ... ... | 1·8 |
| Arachidic ... ... | 0·4 |

In all these published analyses no mention is made whether the fruit was summer or winter fruit, whether it was fresh off the vine or wilted, and in what state of maturity.

### Viscosity Heat Relation

The pulp of the purple passion fruit contains starch granules of typical form and size. In fresh pulp, the starch granules form larger aggregates representing the contents of individual arillus cells. After agitation, numerous single granules, together with a few twins and triplets, can be seen.

The change of viscosity of passion fruit juice under heat treatment differs from that of a pure sugar solution of the same concentration. At first, the viscosity decreases a little, then increases rapidly, and finally decreases again slightly.

The initial decrease corresponds with the behaviour of a sugar solution. With further heating the viscosity reaches a maximum at a certain temperature which coincides with the temperature of complete gelatinisation of the starch as observed under the microscope. It is therefore assumed that the gelatinisation of the starch is mainly responsible for the increase in viscosity. Fig. 1 represents the viscosity/heat relation in natural fruit juice at a *p*H of 3·2.

In detail the viscosity/heat relation was found to be as follows: at 50°C. (122°F.) the first signs of gelatinisation occur, the largest granules increase their volume. At 55°C. (131°F.) the beginning of gelatinisation can be seen more distinctly, the viscosity curve begins to rise, the circumferences of the larger granules become softer, and the granules begin to dissolve into ring-shaped forms. On further heating, this process encroaches gradually upon the smaller granules which are more resistant, until a temperature of 78° to 82°C. (172° to 179°F.) is reached. The viscosity goes through a maximum at 80° to 82°C. (176° to 180°F.). The larger granules begin to collapse while all the smaller ones are gelatinised by now. At 82°C. (180°F.), the process enters into a third stage:

on further heating, the viscosity decreases again, but does not fall as low as before the heating.

Microscopical examination now reveals that all starch granules have collapsed, and only irregular amylopectin skeletons are left, which colour reddish with iodine. These skeletons are very heat resisting, and can still be recognised after several minutes' boiling.

#### Utilisation of Seeds

Some importance should be ascribed to the matter of utilising the seeds. Usually, they are separated from the juice when producing the so-called fruit cordials and other beverages.

Some processors leave some of the seeds in the juice to indicate the presence of passion fruit, and in the production of passion fruit butter and similar "spreads" the seeds are usually left in the product. The question is: at what stage—if at all—shall the seeds be separated from the juice?

Experiments have indicated that the first drops of liquid dripping from the opened fruit show less total soluble solids than the liquid immediately surrounding the seed. Although this is less the case with well matured fruit, it may be assumed that the soluble solids are not evenly distributed throughout the liquid phase, and that the concentration is higher around the seeds.

It has also been found that the seeds themselves carry part of the passion fruit flavour. A quantity of seeds was carefully separated from the pulp and, without drying, extracted with ether. After the ether had evaporated there was a trace of a residue emitting a smell reminiscent of ionone. A further quantity of seeds was dried and cold pressed and the recovered oil extracted with alcohol. This extract had a slightly nutty, fruity flavour.

From a practical point of view the following experiment is of interest. Seeds were carefully separated but not dried, added to a 60 per cent. sugar solution, and heated to 75°C. After a few minutes the seeds were screened off. The resulting syrup had a slightly nutty, passion fruit flavour. It is therefore advisable to separate the seeds only after mixing with the sugar and then heating, when preparing syrups and jams. This has the further advantage of loosening the seeds completely from the pulp. For separating, the syrup may then be run through a simple screen. The quantity of syrup adhering to the seeds can be taken up in water, and added to the next batch.

#### Passion Fruit Shells

The shell of the passion fruit contains a fair quantity of pectin, some protein, and water soluble colouring matter (anthocyanins), besides other constituents.

Passion fruit pectin is mentioned in a cookery book,[28] where a recipe is given for making passion fruit jelly by using the shells, and also in a scientific paper throwing light on the construction of the passion fruit pectin molecule.[29]

The pectin may be extracted from the shells in the usual way, and the extract pressed through cheese cloth. The residue consists only of the paper-like stone cell tissue of the shell. The extract is turbid and strongly coloured. The jelly strength of the shells was found to be about 1-2, *i.e.* one pound of fresh shells contained enough pectin to set a jelly made from one to two pounds of sugar under suitable conditions. Such a jelly, made from shells, sugar, and acid, has a pleasant fruit flavour reminiscent of elderberry jam. To such a passion fruit shell jam a quantity of separated seeds, corresponding to the number of shells used, was added after the jam had been boiled to proper concentration and had cooled down to 80°C. (176°F.). After a minute or two, the preparation when still liquid was passed through a sieve wide enough to retain the seeds, and allowed to cool in jelly glasses.

The finished product set well, was easily spreadable, and its flavour was good.

In the use of the above-mentioned method of adding the seeds to the cooled syrup, there should be little delay before screening off the seeds, because when the jam is allowed to cool too much and is then rubbed through a screen, it will not set properly. Furthermore, the pectin content of the shell varies with different stages of maturity, and a small laboratory test batch should always be made to ascertain the jelly strength of the shells.

ACKNOWLEDGMENTS.—The author wishes to express his thanks to D. W. Grover, Head of Food School, East Sydney Technical College, for his valuable suggestions and for reviewing the manuscript. He also thanks all official and private persons who so generously helped with supplying data.

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# The History of Condensed Milk

JUST a century ago, the American Gail Borden prepared the first really successful condensed milk in commerce and thus began a new chapter in food technology. Although he was not granted his patent (U.S.P. 15,553) until 1856, his product of 1854 is now seen as the forerunner of the first-rate commercial product of today.

Others before Borden had made attempts, with varying success, to concentrate milk to preserve it, even if only for "Government Arctic expeditions" as Edward Moore told a British committee enquiring into preserving possibilities. Appert in 1811 had prepared milk tablets and some evaporated milk, these not being so successful as his discovery of milk pasteurising made before Pasteur himself.

In 1835, the credit for pioneering condensed milk might well have gone to an Englishman, William Newton. Using the vacuum pan invented by Howard in this country, Newton introduced and patented his process for concentrating milk by heating with steam indirectly, and using a current of air to speed up the partial evaporation. Newton, like others before Borden, added sugar before evaporating the milk, previous experience having shown that without it not only did a taste develop during concentration, one which, along with a slight smell, vitiated any hopes of commercial success, but also that sugar preserved the product longer.

Since the Frenchman Malbec had concentrated milk with sugar in 1826, and in view of Grimwade's patent of 1847, it may be asked why Borden gets the credit in this field. The answer is that Borden achieved success with a process which was the key to all the processes of Anglo-Swiss companies and others. Early workers on evaporated milk tended to prolong the heating so that casein and its calcium derivative became less soluble; hence the objection of the consumers to a sediment on reconstituting the milk. Further, to avoid the action of thermophilic bacteria, sugar additions had been the rule until Borden produced first-rate samples of sweetened and unsweetened milk.

By evaporation *in vacuo* to what he called a semi-fluid state, and also by evacuating the space within his "tin boxes" before finally sealing, Borden advanced far beyond Newton's "honey-like mass" which kept "fairly well in pots." The unsweetened form, claimed to be free from "sugar or other foreign matter," became even better when fuller sterilisation of the contents of tins before sealing was carried out.

Opposition or prejudice was to continue for many years, particularly since considerable quantities of inferior condensed skimmed milk from butter factories were put on the market. Borden sold his "Eagle Brand" of sweetened milk, but became father of the industry with his

> "Borden's Condensed Milk. Prepared in Litchfield County, Connecticut. The Only Milk without Sugar or other Substances. The Committee of the Academy of Medicine recommend it for Purity, Durability and Economy. For Sale at 173 Canal Street, or delivered at Dwellings in New York or Brooklyn at 25 cents per quart."

His first factory at Wolcottville, Litchfield County, was the foundation of a great industrial venture, helped considerably by the increasing demand for condensed milk during the American Civil War.

Early in the present century there were more than 50 Borden factories, while in 1902, the Anglo-Swiss company sold its entire American interests to Borden's company, this after having invaded the United States with several large factories. Fifty years ago, the Anglo-Swiss concern in Europe, which had begun operations in 1866 with a factory at Cham on Lake Zug in Switzerland, joined Henry Nestlé of Vevey to give the Nestlé Anglo-Swiss combination.

Linked with Borden's field of activities was the success achieved by dried milk powders 50 years ago, this after Just in America and Hatmaker in the United Kingdom had patented their evaporation process involving the well-known film evaporation technique. Grimwade had been granted a patent for milk powder as long ago as 1855, evidently before the time was ripe for dried milk. He seems to have been doubly unlucky with his patents for both condensed and dried milk. Gail Borden succeeded because he persevered in the face of difficulties in preserving without sugar.

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# An Alphabet of Cheese Varieties

ACCIDENTAL modifications or changes in one or more steps in the making of cheese throughout the centuries have been largely responsible for the development of its different varieties. These changes were little understood and difficult to duplicate because scientific knowledge of bacteriology and chemistry was lacking.

In his introduction to a recent publication,* George P. Sanders, of the Division of Dairy Products Research, Bureau of Dairy Industry, U.S. Agricultural Research Administration, shows how increased scientific knowledge has made it possible to control more precisely each step in the process and to manufacture a uniform product. Cheese making was thus becoming a science rather than an art as heretofore.

Descriptions of more than 400 cheese, ranging from Abertam, a hard cheese made in the region of Carlsbad from ewe's milk, to Zomma, a plastic-curd, Caciocavallo type cheese made in Turkey and very much like Katschkawalj, are contained in this handbook. Typical analyses, based on data in the literature, where available, are given.

This book is not intended as a guide to cheese making, but rather as a means of helping consumers to recognise the various kinds by name.

* *Cheese Varieties and Descriptions.* By George P. Sanders. Handbook No. 54. Pp. 151. U.S. Dept. of Agriculture. Price 45 cents.

## Dietetic Flours

THE biological value of a protein is essentially the resultant of the percentage composition of indispensable amino acids, *i.e.* of amino acids that cannot be synthesised in the organism. The dietary importance of the gluten of wheat flour lies in the fact that it contains such amino acids as lysine, tryptophan, and cysteine. The benefits of these protein constituents are increased in the gluten-enriched flours, which may contain 25 to 35 per cent. of protein as against about 10 per cent. in normal flours. Italian workers have demonstrated, in fact, that wheat gluten with the addition of salts and vitamins is capable both of supplying all the requirements of growing animals and of maintaining adult animals in normal health. There is therefore ample biological justification for the use of flours with the above-mentioned gluten content.

Recent research has demonstrated the biological and dietetic value of what have been called the non-essential amino acids of gluten, outstanding among which is glutamic acid. Professor Vacirca (of the Turin Centre for the Study of Amino Acids) has indicated a correlation between the pharmacological value of gluten and the glutamic acid content. Noting that the acid is present in greater quantity in gluten than in casein and also in a more readily available form in the former, the professor goes on to say: "Glutamic acid is not converted into glucose in the organism of animals poisoned with alloxan, while when injected endovenously into animals it does not aggravate pancreatic injuries but tends to alleviate them. Glutamic acid (among certain other protein components) promotes the restoration of the functioning of the beta cells of the pancreatic islands." Vacirca's conclusions are supported by clinical observations of the benefits to diabetics of prolonged dieting with gluten-enriched foods.

Apart from their recognised value for growing children and for diabetics, gluten-enriched breads can form a valuable part of the diet in various ailments if certain supplements are included. What are known as lipotropic factors, for example, among which is methionine (a sulphur-containing amino acid), may be included in carefully proportioned amounts in bread eaten by sufferers from obesity.

## Materials Handling in America

THE subject of the last James Clayton Lecture given by Mr. James R. Bright, M.S., M.A.S.M.E., the Chief Editor of *Modern Materials Handling*, of Boston, Massachusetts, to members of the Institution of Mechanical Engineers in London was "How American Industry is attacking the Problems of Materials Handling." Materials handling, he said, was one of the fundamental activities of mankind, and a common denominator of all industry, yet it had been more or less neglected by engineers and management generally. In America, however, realisation was growing that materials handling accounted for the largest single activity cost in manufacturing and distributing.

In one American plant, the time spent for materials handling showed an annual labour investment of 8,133,060 hours, compared with the next largest operation, testing, which consumed slightly less than 4,000,000 hours. The hours shown did not include all handling, but only time recognised and paid for as handling labour. It could be assumed that 20-30 per cent. or even more handling was recorded by the accountant as part of the production operation.

Apart from reducing cost, industry had realised that handling was often the production bottleneck between processes and, perhaps more important, handling for storage. Transport loading operations represented not only a bottleneck—tying up vehicles—but also a wasted expense benefiting no one.

Handling should be regarded as an essential operation requiring continual improvement whenever possible, and its costs should be examined more closely than hitherto. Many had failed by imagining that to install an efficient handling system, it was only necessary to "go down the street" and buy a forktruck. In smaller plants and in congested shops the lighter, more manoeuvrable and cheaper pedestrian controlled power lift trucks were gaining wide acceptance.

Another American development was toward new conceptions of packaging to team with new handling techniques, for example, the use of "unit load pallet packs" made in paperboard which not only reduced packaging costs but also decreased the incidence of pilferage and damage during transit to consumer.

## Beet Sugar Refining in the U.S.A.

(*Continued from page* 144)

ing record of output but also to furnish comparative data for analysis of costs and efficiency. The examination of such data from all plants is one means of effective control by the parent company over the operations of its many plants.

The continuous operations of the refinery, with three eight-hour shifts daily, throughout the short campaign period, require numerous hourly checks on all phases of operations. It is essential that the process continue without interruption and with as high an extraction of sugar as possible, because beets are received continuously from the fields and prolonged storage reduces their sugar content.

The smallest number of man-hours expended per ton of beets is always associated with the fastest slicing rate, because the workers, in most cases, perform the same functions for any slicing rate. The data which indicate the performance of the various operations are recorded by the foremen, chemists' samplers, or operators on forms *ad hoc*.

Such records show both operating characteristics of the equipment and chemical or analytical results of tests on the material in process. In addition, a major control item is the listing of delays and their causes.

# Abstracts From Recent Food Literature

**Rust-free Steel and its Application in the Canning Industry.** C. Lagneau (*La Revue de la Conserve de France et de l'Union Français*, 1953, **9**, Dec., 40).—The choice of appropriate metal alloys for canning should be governed by the food product to be canned. Certain products may produce corrosion. In such cases, a range of different types of rust-free steel is available. Such material does not require lacquering and can be easily cleaned. The risk of food contamination is greatly reduced, which is of special importance in the case of acid products. Certain types of rust-free steel are particularly suitable for sulphite-treated fruit juices and for sauces containing vinegar or wine.

**Detecting Deficiencies in Chocolates filled with Brandy or Liqueur.** J. Wurziger (*Gordian*, 1954, **53**, 9).—It has been observed in a number of cases that the liqueur filling of chocolates disappears under unfavourable storage conditions. This deficiency, sometimes wrongly blamed on the manufacturer, is often difficult to detect. Investigations carried out by the German Chemical Research Institute at Bremen have shown that, at unduly high storage temperatures, certain kinds of alcoholic fillings are almost completely absorbed by the enrobing chocolate wall which subsequently caves in at the thinnest points. The absorption of the filling leads to changes in the consistency of the chocolate walls, which acquire a noticeably higher content of invert sugar and water so that the detection of sub-standard goods is facilitated.

**Industrial Processing of Tunny.** A. Buffa (*Conserve e derivati agrumari*, 1953, **2**, 172).—The author describes the present rather primitive methods of tunny processing, especially the manufacture of oil preserves, and puts forward proposals designed to shorten the duration of the process, to increase the efficiency of the plant, to reduce wastage, and to save oil and labour. The proposals include the use of new washing plant, pressure cooking equipment, the adoption of a heat-oiling process and, in particular, of a centrifugal drying process which is stated to have important hygienic and economic advantages. The article is accompanied by drawings illustrating the washing and heat-oiling machines and a prototype layout for a factory with a capacity of five tons of finished products per eight-hour shift.

**The Amino Acids in Fruit Juices and Seeds. Their Detection and Determination by Chromatographic Methods.** G. Safina (*Conserve e derivati agrumari*, 1953, **2**, 178).—As a preliminary step towards more profound research on the influence of amino acids on the deterioration of canned citrus juices, the author has used chromatographic methods to determine, qualitatively and quantitatively, free amino acids and of those freed after the hydrolysis of seeds and juices. It was found that orange, lemon, and mandarine seeds all contain the same number of amino acids, *viz*. aspartic acid, glutamic acid, alanine, phenylalanine, glycine, leucine, lysine, proline, serine, threonine, and valine. After the hydrolysis, cysteine is also encountered. The juices of oranges and lemons contain the same amino acids as the seeds, including cysteine but excluding glycine for which asparagin is substituted; neither asparagin nor cysteine is present after hydrolysis.

**Research on Tomatoes Canned in Sicily.** A. Buffa, R. Sarà, A. Micale (*Conserve e derivati agrumari*, 1953, **2**, 182).—A series of articles, written by research workers of the Fisheries and Preserves Research Station at Palermo, dealing with various aspects of canned tomato products. For instance, an analysis of samples of tomato pulp from all Sicilian factories revealed a low sugar content attributable to the raw material used, but there was no evident correlation between the sugar content and the colour shade. High copper contents and occasional mould found in some cases indicate the need for overhauling the machinery in some factories; however, a comparison of tests carried out during the last five years shows a definite trend of improvement in this respect. In another series of tests, a comparison has been made between the dry residue of tomato products subjected to heat treatment at 100°C. and to vacuum treatment at 70°C. respectively; the greater the concentration, the greater the differences.

**Determination of Fruit Juice Contents through Formol Titration.** E. Benk (*Gordian*, 1954, **53**, No. 1276, 16).—With citrus fruit juices, the addition of peel pulp is unavoidable to obtain the desired aroma, but the admission of such admixtures necessitates efficient analytical control. One such method is titration with formol, first suggested by Tillmans in 1927 and later supplemented and improved by Schrempf and the present author. In its improved form, the determination of the formol value, which indicates the amino acid contents, provides a reliable indication of the quantity of pure fruit juice in fruit juice products.

**Use of "Polyane" Film of Polyethylene Plastics for the Packaging of Confectionery.** J. Ducluzaux (*Revue technique de l'industrie alimentaire*, 1954, **2**, 37).—Brief appreciation of the advantages of "Polyane," a transparent film of polyethylene plastics, as a packaging material. This material is of high mechanical strength, moisture-proof, light, and flexible. Bags made of this material can be heat-sealed by means of fusion and thus afford complete protection of the contents. The film is also used as a second protection for boxes of chocolates, etc. Proprietary names, trade marks, etc. can be printed on the film.

**A Visit to the "Biscuiterie Alsacienne."** R. Mouchet. (*Revue technique de l'industrie alimentaire*, 1954, **2**, 12).—Detailed, illustrated description of an important modern biscuit factory in Alsace, where nine standard types of high quality biscuits are mass-produced. The report covers the complete manufacturing process,

from the arrival and storing of the raw materials to the preparation of the different kinds of dough, the sample testing, the various oven - cooler - packing assemblies designed as integrated conveyor belt systems, and finally the finishing, storage, and despatch of the finished products. Owing to the complete mechanisation of the plant, the output is five times as great as in 1939.

**A New Accelerated Meat Curing Process.** H. Sens (*Die Fleischwirtschaft*, 1954, **6**, 5).—Description of a method, suggested by Dierkes, of accelerating the penetration of the brine into the meat by means of sound waves (not ultrasonics). The waves are generated by means of a special device, made of rust-free metal and connected to a transformer. The method may or may not be used in conjunction with the muscle injection system and it has been found that meat treated thus gives exceptionally good results. Subject to further improvements, the method may prove an advance in the speed of meat curing, as well as improvement of its quality.

**The Manufacture of Meat Extract.** H. Müggenburg. (*Die Fleischwirtschaft*, 1954, **6**, 11).—The history, composition, and processing of meat extract, from the time of Liebig to the present day, are reviewed. A detailed description is given of a modern method of producing high quality meat extract from 30 per cent. and 70 per cent. heart, and of two other methods suitable for extract of meat of lower quality. Evaporation of the liquors is carried out at low temperatures.

**The Cashew Nut.** A. E. Haarer (*World Crops*, 1954, **6**, 95).—The characteristics of the plant are described and discussed and indications are given of how the cultivation of the tree as a crop might, with advantage, be extended.

**Rigor Mortis in Beef.** B. B. Marsh (*J. Sci. Food Agric.*, 1954, **5**, 70).—A study of the onset of *rigor mortis* in the *longissimus dorsi* muscle of the ox, extending similar observations previously made on rabbit muscle. The changes in *p*H and adenosine triphosphate (ATP) content accompanying the physical manifestations of *rigor* are described. As in rabbit muscle, the development of inextensibility accompanies the dephosphorylation of ATP and, provided the ultimate *p*H is low, the fall in *p*H runs parallel to these changes. The rate of decrease in *p*H is almost identical with that in rabbit muscle at physiological temperature, but differs appreciably from it at lower temperatures. The results in relation to the time required for the completion of the onset of *rigor mortis* in commercial chillers are given.

**Torula Yeast from Potato Starch Wastes.** C. O. Reiser (*J. of Agric. and Food Chem.*, 1954, **2**, 70).—Laboratory scale experiments have the possibility of propagating torula yeast on the waste protein water from a starch plant. Reductions of 60 per cent. or better in the five-day B.O.D. would attend the production of a yeast food amounting to about 40 per cent. of the total solids fed in the solution. A 30 ton starch plant would produce approximately 4.5 tons of yeast daily at a cost of five cents per pound and an investment of $165,000. Blending of the yeasts with the waste pulp stream may make the process more attractive.

**Stills for Essential Oils.** E. Brown and H. T. Islip (*Colonial Plant and Animal Products*, 1953, **3**, 287).—A memorandum prepared on the advice of the Consultative Committee on Essential Oils of the Colonial Products Advisory Bureau to assist colonial distillers, particularly those with no previous experience of the production of essential oils. Two appendices deal with the theory of distillation and recommendations for the harvesting, preparation, and distillation of some essential oil plants grown or suitable for cultivation in the colonies.

**The Preservative Treatment of Timber in Building.** H. A. Cox (*Building Materials Digest*, 1954, **14**, 50).—In outlining the organisms which attack and damage timber, the author describes insect pests and the appropriate treatment for the infested woodwork in each case.

**Polyethylene for Citrus.** H. W. Hruschka and J. Kaufman (*Modern Packaging*, 1954, **27**, 135). — Approximately 1,500 packages of the various citrus fruits were used in tests comparing shelf life, decay, weight loss, appearance, and juice flavour of fruit packaged in non-perforated or perforated polyethylene film and in mesh bags or unwrapped open chipboard trays. As a result of these investigations, polyethylene was found to be a satisfactory bagging or wrapping material for citrus fruit when sound, vigorous fruit was packed and moved fairly rapidly through retail channels. Perforation of bags with at least eight holes was beneficial; holding at 46° F. prolonged the shelf life by at least four days compared with holding at 70° F.

**Fish Handling and Processing in U.S.A.** W. A. Empey (*Fisheries Newsletter*, 1954, **13**, 11).—In the nineteenth of a series of articles, the author describes the processing operations for iced shrimp, frozen shrimp, canned shrimp, and dried shrimp.

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**The Vitamins**

(*Continued from page 147*)


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# News from the Industry

## FORTHCOMING EVENTS

### The Royal Sanitary Institute

The annual Health Congress is to be held at Scarborough from April 27 to 30.

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### The Purchasing Officers Association

The 1954 Minibition will be held concurrently with the National Conference of the Purchasing Officers Association at the Royal Hall, Harrogate, from September 30 to October 2.

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### The Royal Institute of Chemistry

A meeting is to be held at the Luton Town Hall on April 22, with the Luton Scientific Association, when Dr. Tudor S. G. Jones will read a paper on "A Modern View of Chromatography."

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### The Institute of Biology

A meeting is to be held on April 21-22, under the auspices of the Institute of Biology, to discuss the training of biologists. There will be four sessions: on the teaching of biology in schools to those intending to specialise; on undergraduate courses at universities; on biological work in technical colleges; and on post-graduate training. Ample time will be allowed for discussion after the reading of papers.

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### The Society of Industrial Engineers

Because of the recognised need to secure greater effectiveness in plant maintenance and particularly to explain how work study can be employed for the purpose, a study conference is to be held by the Society of Industrial Engineers at Roffey Park, Horsham, on April 9 to 11.

The opening address will be given by a member of the Anglo-American Productivity Team on Plant Maintenance.

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### The Society of Chemical Industry

The annual general meeting of the Microbiology Group will be held on April 8 at the Medical Society of London when Sir Ian Heilbron will give an address entitled "Research at the Brewing Industry Research Foundation."

A symposium on "Ion Exchange and its Applications" will be held by the London Section at the Senate House, University of London, on April 5, 6, and 7.

The annual general meeting of the Crop Protection Panel of the Agriculture Group will take place on April 12, when the chairman, Dr. R. A. E. Galley, will address the meeting.

The annual general meeting of the Food Group is to be held on April 14.

A special meeting at which young members of the Food Group will read short discussion papers on work, methods, or apparatus which they think will be of interest to other young members will be held on Wednesday, May 12, 1954, in the Rooms of the Medical Society of London, 11, Chandos Place, London, W.1.

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### Borough Polytechnic

An exhibition of the National Bakery Students' work is to be held at the Borough Polytechnic on April 7, 8, and 9.

On April 7, the exhibition will be open from 10 a.m. to 9 p.m. to the parents of all students, employers, of part-time students, former students, and all members of the various bakery trade associations.

On April 8 and 9, the exhibition will be open to all those who are not able to be present on April 7 and also to members of the general public and to school parties which are being invited from the Secondary Schools in the London area.

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## OBITUARY

**Mr. John Guy Henderson Huntley** in an aircraft disaster at Singapore on Saturday, March 13, 1954.

Mr. J. G. H. Huntley.

Guy Huntley, who was the Deputy Head of the Research Division of The Metal Box Company, was returning from a tour of Hawaii, New Zealand, and Australia, where he had been visiting some of the company's overseas interests.

Born in 1908, he was educated at St. John's College, Cambridge, and later became interested in the rapidly expanding food canning industry. He was a leading authority on canning technology both in this country and overseas and was closely associated with the development of The Metal Box Company's technical and research services to its Open Top can customers. He had been a member of the committee of the Food Group of the Society of Chemical Industry and had served on the Campden Technical Panels. He represented his company on the *Comité Internationale de la Conserve* and he will be remembered for his work in connexion with the International Standards Organisation on the subject of can standardisation.

**Dr. P. C. C. Isherwood, O.B.E., Ph.D., F.R.I.C.,** chairman of W. J. Bush and Co., on Wednesday, March 3.

In 1901, Dr. Isherwood was appointed chemist-in-charge of the Ash Grove and Mitcham factories. He made a notable contribution to National chemical requirements during the first world war when in 1916, owing to the shortage of pure zinc, he erected and operated a plant under his own patents at the Bush factory at West Bank, Widnes, receiving the O.B.E. in recognition of these services.

Dr. P. C. C. Isherwood.

During the second world war, his experience permitted the company to contribute certain products vital to the needs of the Ministries of Supply and Aircraft Production.

In 1915, Dr. Isherwood became a director of W. J. Bush and Co., and in 1935, on the death of Mr. A. W. Bush, he assumed the office of joint managing director, becoming chairman in 1941 on the death of Mr. J. M. Bush.

Dr. Isherwood was a member of the Grand Council of the Federation of British Industries, chairman of the Association of British Chemical Manufacturers from 1943 to 1945 and President from 1947 to 1949, and from 1941 chairman of the British Essence Manufacturers' Association. He was also a Fellow of the American Chemical Society.

Dr. Isherwood was born at Runcorn, Cheshire, in 1877. A son by his first marriage, and Mary Isherwood, his second wife, survive him.

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**Mr. T. Mowbray,** following a short illness, on February 1.

He entered the service of Stevenson and Howell in 1903, during the greater part of which time he represented them in the South London area with conspicuous ability and success.

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**Mr. Edward Bonser,** former secretary to the Bolsover Home Grown Fruit Preserving Co., Chesterfield, at the age of 67.

He had been in the food preserving trade for 47 years.

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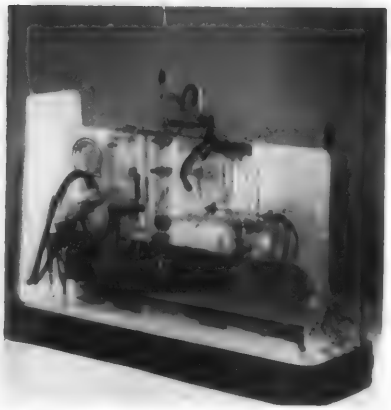
### Packaging in the Plastics Federation

A Packaging Sub-section has been formed by the British Plastics Federation.



A portable laboratory.

### A Vest-pocket Laboratory

Making use of 61 components from the Quickfit and Quartz range of interchangeable laboratory glassware, Dr. J. T. Stock and Mr. M. A. Fill, of Norwood Technical Institute, have evolved what is described as "an almost complete organic laboratory" light in weight and easily transportable.

The semi-micro-organic unit is mounted on a wooden stand, surfaced with Formica laminated plastic sheeting. The base of the assembly incorporates two drawers, inside which are test-tube racks for spare apparatus and thermometers.

Assemblies of this type could well be employed for such tasks as the determination of insecticides in orchards, hop gardens, on farms, and for anti-gas work in the event of war.

The new assembly, shortly to be put on the market by the company, will save time for lecturers and analysts, since it is ready assembled and does not need to be dismantled; it will minimise breakage costs and be economical in the use of chemical reagents.

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### Disinfestation of Ships' Holds

After the demonstration and treatment of the S.S. *Ivor Jenny* at Hull in August last (FOOD MANUFACTURE, 28. 10, 397) she proceeded to Hamburg to load phosphate for Japan. Although a vessel may not, immediately prior to coming to a grain loading port, have carried a grain load, it is nearly always found that the cargo holds are not properly clean and consequently residual grain is left on the frames and beams and in the corners of the bilges and it is at these points that infestation and breeding take place. Consequently, after a phosphate cargo of the solid type has been removed, the infestation is manifest. In the case of the S.S. *Ivor Jenny*, the holds had been properly cleaned and sprayed with Pybuthrin No. 44, using the three Microsol sprayers as recommended. The results appear to have been very satisfactory.

By using the Microsol sprayers with Pybuthrin No. 44 for the cargo holds and Pybuthrin No. 33 for the accommodation and store rooms, the infestation position seems to have been kept well under control.

In his report on activities at the loading port of Vancouver, B.C., during the period November 17 to 25, 1953, the captain of the *Ivor Jenny* stated that officials of the Department of Agriculture examined all holds and immediately passed the same, the certificate being endorsed: "Holds exceptionally clean and free of live insects."

The entire passage across the Pacific Ocean from Tokio to Vancouver was devoted by deck crew to the sweeping after potash cargo, cleaning all bilges, washing down all holds with very strong pressure of water from deck hose, again cleaning out bilges, and pouring liquid carbolic into bilge spaces. As each hold dried out, the three Microsol sprayers were lowered into each hold in turn, all ventilators canvas covered, and the Microsol fumigant sprayed as per instructions. Further inspection showed dead insects and, as a final precaution, each hold was hand-sprayed around bilge boards and given a final sweeping before arrival at Vancouver. The Inspector was duly impressed with the result.

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### Easter Egg Packs

Two Easter Egg packs have been devised this year by Kunzle. In the ½ lb. pack, the Easter Egg, foiled and ribboned, contains approximately ¼ lb. of chocolates which are partly foiled and packed into a cellulose film satchel. The Cellophane-wrapped Egg, placed in a multi-coloured lithographed carton depicting a fairground roundabout, is held in position by means of a top and bottom punched platform. The top and bottom closure of the carton is worked up to give an illustration of flower petals.

The 1 lb. Easter Egg is packed with approximately ½ lb. of assorted chocolates, individually packed in chocolate crimped cases. The Egg itself is elaborately decorated and, after film wrapping, is packed into a multi-coloured display carton.

### Film for Packaging

British Visqueen have now assumed I.C.I.'s responsibilities for polythene film (Alkathene) and have begun marketing Visqueen.

British Visqueen is the joint company formed last year by Imperial Chemical Industries and the Visking Corporation, of Chicago, U.S.A.

The new factory at Stevenage, planned solely to produce Visqueen, will be the most modern and efficient unit of its kind in the world, incorporating productivity features from both this country and the U.S.A. Important economies in production will be made which will be passed to the consumer. At the same time, the company will offer a range of tubular film sizes greater than anything yet available in this country and the equal of that available in the U.S.A.

The company will not convert or print film; their policy is to act as suppliers to the converter industry of high quality film on which printing can be carried out by traditional methods.

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### Polythene Bags for Sweets

Seven pound polythene bags for the packing of boiled sweets in bulk as an alternative to glass or tin are now being used by the home confectionery trade.

Pioneers of this important change in sweet packing are Flexible Packaging, a subsidiary of Transparent Paper, who claim that gains in costs, transport, handling, administration, and factory space may ultimately go a long way towards establishing this non-returnable type of pack throughout the confectionery trade.

The new method consists of the use of a large Diothene bag which can be printed in up to four colours, or supplied plain with an enclosed paper label, and a carton into which the bags are placed for transport. As there is no return of bottles and tins, there is considerable gain in time spent at each shop and by the driver and warehouse staff on the return of the vehicle to the warehouse where much space and labour are also saved.

In the factory, all bottle and tin washing, screw lid cleaning and sorting, and the internal handling and transport of the bulky empties are eliminated; the reduction of subsequent operations during and after refilling is also considerable.

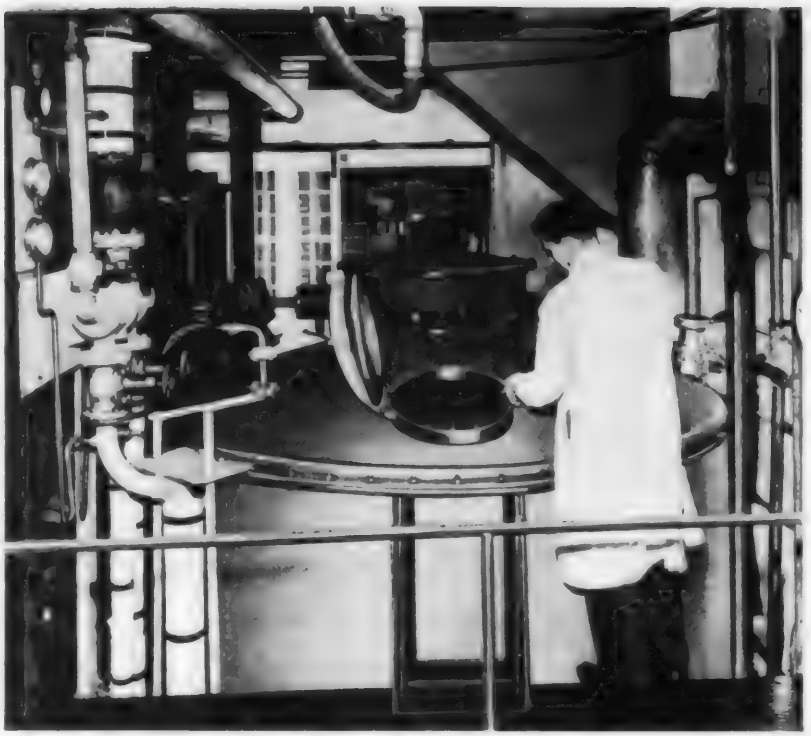
At present the Diothene bags are available in 7 lb. sizes, but a 4 lb. alternative size will shortly be available.

Seven pound polythene bags used by John S. Derbyshire and Son.

### Installation of New Caramel Plant

A new stainless steel caramel cooker, fabricated to their specification by A. Johnson and Co. (London), has been put into commission by George Clark and Son. Designed for a normal batch size of six tons, the equipment is capable of handling eight tons with some types of caramel. It has twin heating and cooling coils, and at the height of the cooking process is calculated to be putting heat into the caramel at the rate of 4,000 lb. of steam per hour. All the controls are grouped so that one operator can attend to the entire operation without leaving the working platform.

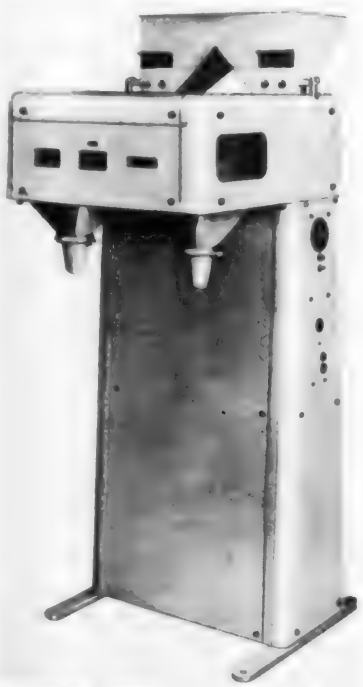
From the outfall of the cooker, caramel passes over a Russel separator and thence to a small drop-tank. From there, a Mono pump takes it to Prodorglas-lined holding tanks, whence it passes through an all-stainless Metafilter unit into Prodorglas-lined final storage tanks for racking.



The control platform of Clark's new caramel cooker.

### Weighing Coalescent Substances

Accurate high speed weighing of substances such as shredded suet, icing sugar, milk powders, materials which by their nature tend to coalesce, has long been a difficult problem in the food industry. To overcome this, Autopack have developed a further model of their vibrator feed weighing machine. The new machine consists of two distinct units linked to work simultaneously. Electrically operated and controlled vibrators feed the material from the main hopper into the scale pans of the automatic weighing machines.



Autopack weigher for coalescent substances.

The steady feed of the product from the vibrators is arrested and the fill is discharged when the required quantity is reached. The twin funnels have a much steeper angle of discharge than is given by the standard machine.

Amounts up to 1 lb. may be weighed by the machine, although it can be supplied to weigh larger amounts if required. The overall tolerance is only $\frac{1}{2}$ per cent. at speeds of 36 to 40 weighings per minute. If necessary, the machine can be supplied arranged to discharge the output of both units through a single funnel.

### APPOINTMENTS AND RETIREMENTS

Sir Frank Engledow, C.M.G., F.R.S., chairman of the Food Investigation Board of the Department since 1947, retired from this post on March 31. Dr. R. Holroyd, Director of Research, I.C.I., will become chairman of the Board and will serve in that position for a period of five years.

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The retirement of Mr. T. N. Morris, M.A., Dip. Agric., of the Low Temperature Research Station, Cambridge, has been announced. It was in 1907 that Sir William Hardy appointed him head of the canning section at the Low Temperature Research Station. Work in this section was initially concerned with corrosion problems relating to tinplate cans but was later extended to include the freezing of fruit and vegetables, the concentration of fruit juices, the dehydration of foods, and the behaviour of pectin in fruits during storage and processing, particularly in relation to the manufacture of jams and jellies. His last few years at the Station were mostly occupied in writing reviews and editing papers for publication.

Apart from his scientific occupations, his main interest has been in practical farming, and he intends to apply his scientific and agricultural knowledge to this.

Mr. Morris has published several books which have become standard works on their subjects and a large number of papers on diverse aspects of food.

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The appointment of Mr. C. H. Brissenden, B.Sc., to the post of assistant manager of the Dairy Engineering Department is announced by A.P.V.

During the past year, Mr. Brissenden has made an extensive tour of South America and the Caribbean area, visiting local A.P.V. Agents and discussing new schemes which are under consideration for these areas.

*

Following the resignation of Mr. John Thomson upon his appointment as works manager to the Drambuie Scotch Whisky concern, Mr. A. Houlton has been appointed Scottish representative of the Purdy Machinery Co. and of their associate company, Farrow and Jackson.

**Direct wraps of Cellophane cellulose film are used for the new ½ lb. unit packs of Wright's Biscuits.**

### Variety in Biscuit Packs

The modern trend in biscuit packing, with a special eye to self-service and multiple sales, is apparent in the range of new half-pound unit packs from Wright's Biscuits.

Direct wraps of Cellophane cellulose film are used for Nice biscuits and other types and bright four-colour printed boats and trays for ginger nuts, shortbread, and petit beurre varieties. The latter often include puzzles and drawings printed on the base of the carton. On all the packs the familiar figure of Wright's "Mischief" trade mark appears in various forms.

A new and original departure is represented by the unusually printed bags of Cellophane cellulose film of rather stouter gauge for ginger crunch and macaroon biscuits. Closure is made by folding over and heat-sealing the top of the bag. When filled, the bags stand firmly upright on the counter or shelf and make stimulating display items. The bags for macaroons are printed in blue, white, and red with bold brand name, broad band at base, and tiny tot figures; those for ginger crunch in maroon, yellow, and blue with a compelling and humorous illustration. The latter is sold by Wright's subsidiary company, Golden Crunch, and the bags are printed by Colodense.

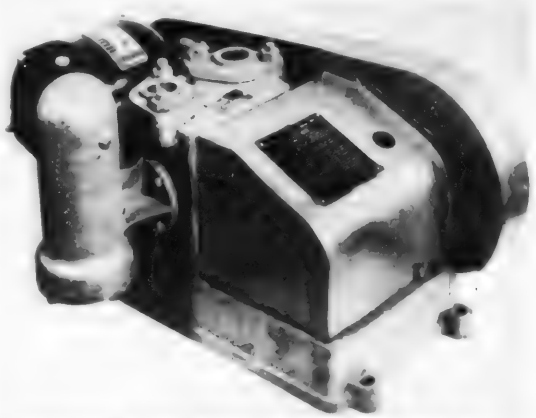
### Pumps and Float Switch Gear

A range of pumps of the centrifugal, rotary, and diaphragm types and float switches are manufactured by Girdlestone Pumps. Of particular interest are their small centrifugal units which can be produced so that only the parts in contact with the fluid being handled are constructed of stainless steel, the remainder of the unit being of cast iron and mild steel. This arrangement results in a much cheaper pump than the all stainless steel component and at the same time provides the same safeguards against oxide contamination of fluids being pumped. Certain of these pumps are also available in gun metal.

The small rotary pumps in ¾ in. and 1 in. sizes and constructed from cast iron or gun metal are suitable for handling viscous fluids which do not contain solids; they are particularly useful for oils and creams.

The diaphragm type pump, which is glandless, can be supplied with the body in cast iron, gun metal, or cast iron and ebonite lined, valves and diaphragms being of various grades of rubber or synthetic rubber to suit the fluid being pumped.

The contact parts of the float switch gear made by the company can be of polythene; standard components are of copper.



**A Girdlestone rubber lined glandless diaphragm pump.**

### Covers for Lamps

Included in the range of new lighting fittings, some of which were exhibited for the first time at the recent Electrical Engineers Exhibition, are the Benjamin clear plastic Visor covers. Designed for use where a non-fragile type of Visor cover is essential, for example, in the food industry, where falling and splintering glass could mean the total loss of a batch, the covers are available in diameters 14 in., 16 in., and 18 in.

### Margate Conference, 1954

Among the stands of the Exhibition held during the conference of the National Federation of Meat Traders' Associations on April 26 and 27 will be those of the Oppenheimer Casing Company, in co-operation with trade associates, who will be demonstrating all operations in the manufacture of many new sausage products and small goods.

The manufacturing demonstrations will include the use of Hypak printed casings for all cooked meats, and Syplex manufactured casings for fresh sausage.

Also to be exhibited will be new methods of display and general presentation, and samples of all products manufactured during the period of the Conference will be available for all Federation members and visitors. These will be distributed from the Oppenheimer Sausage Bar which is now a feature of all meat and allied exhibitions throughout the country.

### Fluorescent Lamps

A fluorescent lamp, called the Deluxe warm white, which has a new attractive colour that blends with tungsten light and resembles it in colour appearance and colour rendition, has been introduced.

Practical experiments show that the new lamp is suitable for the lighting of any premises where people congregate for business or leisure. The new colour is expected to increase the popularity of fluorescent lighting in homes, restaurants, hotels, and shops.

Lamps of this type are being marketed by Philips Electrical and the British Thomson-Houston Co.

Another B.T.H. lamp, known as the Mazda New Warm White, is expected to be particularly in demand in industrial and commercial applications. It will have a greatly increased output, the 80 watt lamp giving an average of 52 lumens per watt throughout life. In addition there has been an improvement in colour appearance.

### Keeping the Tractors Going

Among the main Caterpillar tractors agents in this country are Bowmaker (Plant) Limited, who are well known to farmers in the Midlands, Wales, the West Country, and South West.

The main depot is situated at Willenhall in Staffordshire, with further depots at Colchester Trading Estate, Cardiff, and Fenny Bridges, near Honiton, Devon.

There is a Spares Service supplied from all these depots, but probably the greatest boon to farmers is the Field Service department, which has been considerably extended over the past few years. A fleet of fully equipped vans is now operated by experienced Caterpillar service fitters, capable of undertaking any repairs—from minor adjustments to complete overhaul in the field.

Service vans operate from the three depots and there are resident Field Service fitters in Box, Wiltshire, and Oswestry in Shropshire. The aim of the company is to have Field Service facilities available and within easy reach of every Caterpillar owner in their area. A full range of reconditioned and guaranteed service engines is always available and track frames, complete with rollers and idlers for all models, can be supplied and fitted immediately by the Field Service department.

The free inspection service is another facility offered by this department and advice is given to customers without any obligation at any time. If tractor owners take advantage of this service, maintenance costs can be kept down to a minimum.

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### ERECTIONS AND EXTENSIONS

Plans have been prepared by Kellogg's to construct a new production and stores building in Park Road, Stretford.

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Considerable increases in regional demands for the firm's sausages, pies, and meat products have recently made necessary extensions to Wall's Godley factory. By December, 1953, the factory's output of sausages had doubled the 1952 figure and pie production had increased by 50 per cent.

The problem of increasing the extent of the production departments within the limited space available on the site was solved by taking in the former despatch yard.

Features of the new factory include a flour store, built on a specially constructed mezzanine floor, reached by a flight of steps. A large travelling oven, installed for pie-baking, now supplements two batch ovens. There is also a cooling tunnel for sausages, constructed by the factory's own building department staff. From this cooling tunnel, sausages pass directly on to a conveyor belt.

Bowmaker Field Service staff at work on a Caterpillar tractor.

### Fire Fighting with Carbon Dioxide

A method of extinguishing fire with carbon dioxide gas has been devised by the Walter Kidde Co. Using the dry inert gas, this extinguisher puts out fire easily and without any residue, making it ideal for use in kitchens, bakeries, and factories engaged in the manufacture of food.

Equipment can be designed to handle specific risks by the company, who carry out demonstrations on the first Wednesday of every month.

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### Electrical Treatment of Milk

The late Prof. Wilkinson worked for many years on an electrical method for the treatment of milk. Based on the results of his experiments, a pilot plant is at present being worked in London, and bacteriological and other data are being collated.

The plant consists of a glass tube mounted on the usual laboratory stand and furnished with a coil winding on the outside and one passing through a core tube. These are connected to a rotary electric generator (primary outside and secondary inside) which, by amplification, gives the necessary frequency and voltage, thus creating a magnetic field between them through which the milk passes. The frequency is of the order of the natural frequency of milk and all forms of foreign or harmful bacteria are found to be destroyed as the milk passes through the tubes, the time taken varying between two and three minutes. The electrical side will be taken care of later by an electronic frequency oscillator.

It is claimed that, if the system now being studied on the pilot plant were to be developed on a commercial scale, it would constitute a revolutionary advance on present methods of milk pasteurisation.

### Leicester Factory for Metal Box

The Leicester factory of Murphy Bros. has been acquired by The Metal Box Co.

The factory, which consists of a single storey building covering 74,600 sq. ft. and stands in 16 acres on the main London/Leicester Road, will be primarily engaged in the printing of tinplate and in general tin box making.

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### Manchester Office for Honeywell-Brown

As a further step in their policy of maximum sales and service efficiency, Honeywell-Brown are establishing an office at 35, Byrom Street, Manchester 3, as an addition to those already existing in London, Glasgow, Birmingham, and Sheffield.

The new office will be under the supervision of Mr. Tom Jackman, and will deal with business and enquiries from an area covered by Cumberland, Westmorland, Lancashire, Cheshire, and North Wales.

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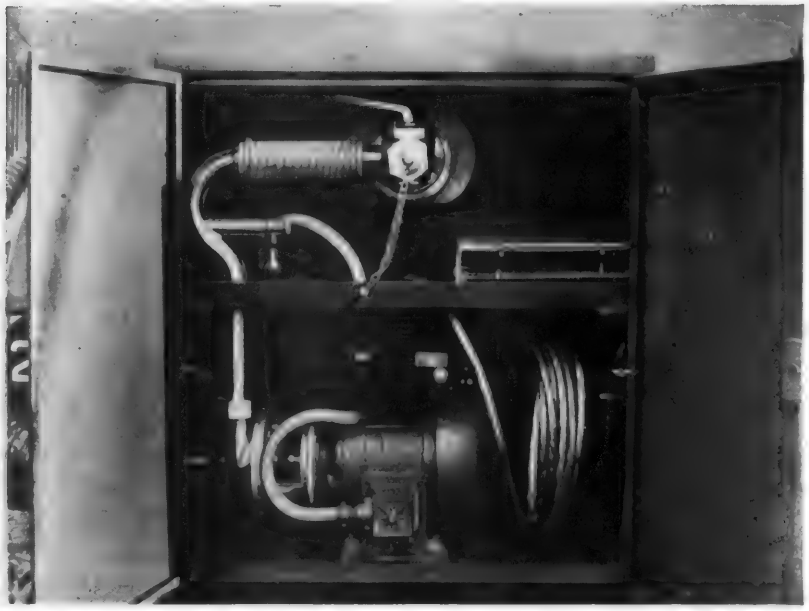
### Food Research at Southall

The formation of a new development department, entirely devoted to work on new products and improved production techniques, is announced by Batchelors Peas.

The new department, which started work at Southall, Middlesex, in February, is under the supervision of Mr. J. H. Pennington, B.Sc., F.R.I.C., previously chief chemist to the company. He will be assisted by Mr. R. L. Trotter, formerly in charge of engineering development, now becoming the concern of the new department. Mr. A. R. Ellison, bacteriologist and formerly chief assistant to Mr. Pennington, is to be works chemist at Batchelors Peas (Southall).



**The rear compartment of the APV 1,500 gallon road tanker containing milk pump for emptying farm storage tanks, sampling device, and rack for sample bottles.**

### Conference Organising Service

In view of the increasing number of conferences and the fact that many firms and organisations have not the facilities to cope efficiently with the vast amount of extra work involved, the Palantype Conference Organising Service has been formed to save time and worry. The Service covers complete conferences organisation, including booking accommodation, engaging staff (interpreters, translators, and verbatim reporters), printing, duplicating, and furniture supplies.

The Palantype Reporting Service also has available a team of experienced verbatim reporters who can attend all types of meetings, Law Court proceedings, and conferences, whether they take place at home or abroad.

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### Cocos Butters

Originators of the cocos butter industry, Loders and Nucoline, have devoted three-quarters of a century to the production of edible fats from coconuts and palm kernels.

Cocos butters are refined, bleached, and deodorised vegetable oils which have been blended according to specific requirements and finally converted into vegetable stearines of varying degrees of hardness under strictly controlled conditions. They form a standard raw material in the manufacture of biscuits, confectionery, chocolate, and ice cream, providing a high digestible fat of exceptional keeping qualities.

With the advent of decontrol of fats, the company will be able to sell their products on a free market and extend still further their range of cocos butters to meet specialised demands.

### Off-flavour in Confectionery

Complaints received by bakers in various parts of the country that their products "smelt of disinfectant like iodine and carbolic" have been examined by the British Baking Industry's Research Association at Chorleywood. In one series of tests, seven members of the staff were each given a piece of cake marked "A" and all reported that it was free from objectionable taste or odour. They then washed their hands, using a soap containing a new germicide, after which they were each given a piece of the *same* cake marked "B." Three said that the second sample was normal and four reported an off-flavour.

The Research Association point out that this test cannot be regarded as conclusive, but in view of the large number of complaints of off-flavours and off-odours which cannot be traced to any recognised source the possibility that the odour may come from the consumer's hands is of great interest.

Other current work of the Research Association reported in the latest Bulletin includes an examination of diastatic activity in bread flour covering its effect on the quality of the bread and on staling; methods of altering the diastatic activity are included.

**Cadbury's 1954 Easter Egg contains ¼ lb. of Milk Tray Chocolates.**

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### Changes of Address

The new address of Birds Eye Sales Limited is Hesketh House, Portman Square, London, W.1. Telephone: WELbeck 4466.

The new premises will house the executive and office departments of the quick freezing firm.

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The offices of Glycerine Ltd. are now situated at Hesketh House, Portman Square, London, W.1. Telephone: WELbeck 4466; telegrams.: Glymol Wesdo London.

*

In order to accommodate recent developments relating to the Mono pump and to provide more extensive premises for the service and sales departments, Mono Pumps have moved to Mono House, 1, Sekforde Street, London, E.C.1.

*

The address of the Association of British Chemical Manufacturers and Affiliated Associations operated by A.B.C.M. staff is now Cecil Chambers, 86, Strand, London, W.C.2. Telephone: COVent Garden 2363 (4 lines). Telegrams: Manuchem, Rand, London.

*

The London office of Joseph Crosfield and Sons is now at Hesketh House, Portman Square, London, W.1. Telephone: WELbeck 4466. Telegrams: Savonnier, Wesdo, London.

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### Humanised Cows' Milk for Infants

A demonstration was held recently at the Royal College of Nursing before Press representatives and others, when the composition, characteristics, and properties of "humanised" Trufood were compared with those of cows' milk, human milk, and another type of dried milk food.

Unlike other milk foods, which are composed of roller-dried cows' milk, the humanised product is a spray-dried cows' milk which has been modified to readjust the proportions of soluble proteins, fats, and carbohydrates, so that the resultant amino acid composition resembles closely that of human milk.

The differences between cows' milk and humanised milk food were convincingly shown at the demonstration.

## COMPANY NEWS

The directors of George Cohen Sons and Co. have resolved that the half-yearly dividend due on March 31, 1954, on the £1,500,000 4½ per cent. Cumulative Preference Stock be paid at the rate of 4½ per cent. per annum less tax, and that an interim dividend of 3½ per cent. actual, less tax, be paid on the £1,500,000 Ordinary Stock of the company on March 31, 1954, in respect of the company's financial year which ended on that date.

■

At a meeting of directors of Beecham Group held on February 19, 1954, a second interim dividend of 19 per cent. actual, less tax, was declared on the Deferred shares of the company on account of the year ending March 31, 1954. This dividend is at the same rate as the second interim dividend paid in respect of the preceding year.

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## BOOKLETS RECEIVED

The wide applications of Dexion equipment in industry are described in the latest issue of *Dexion News*.

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A list of the industries served by Monsanto Chemicals and of the products available, presented alphabetically, has been published by the company.

■

A booklet giving the room and elevated temperature properties of Hiduminium 100, an aluminium base material with a wide range of applications in the food and other industries, has been published by High Duty Alloys.

■

The full text of the representations made to the Chancellor of the Exchequer is contained in a booklet issued by the Federation of British Industries. Divided into two parts, the first deals with matters of general principle and the second with points of detail for discussion with the Chancellor's advisers.

■

A commentary on the proposals made at the annual conference of the Labour Party in October, 1953, for a substantial degree of public ownership of the chemical industry has been prepared by I.C.I., in which are analysed some of the arguments advanced in support of nationalisation, together with the difficulties and dangers involved.

*

Most larger boiler installations today are well equipped with instruments to promote efficiency, but there are many small boiler plants that are still run by methods adopted when coal was cheap and plentiful. Guidance as to the possibilities of modernising such plants with efficiency and economy is provided in a new publication, "Fuel Efficiency in the Boiler House," issued by the Cambridge Instrument Co.

■

The design, manufacture, and installation of refrigerating machinery on board ship are the subject of a new publication issued by G. and J. Weir. The services offered to shipowners are for the refrigeration of cargo spaces up to 90,000 cu. ft. at 10°F., passengers' and crews' food stores and cold rooms, wine and beer coolers, bar and other spaces, ice and ice cream making, cooling drinking water, and cooling ventilating air supplies. The range of equipment to meet these requirements includes fully automatic, semi-automatic, and hand-controlled installations of the brine circulated or direct expansion type, using methyl chloride, Freon, or ammonia as the refrigerant.

In another leaflet are described two models from the range of vertical totally enclosed Uniflow type two-stage compressors, operating on the dry compression system and particularly suitable for low temperature and quick freezing application.

■

A booklet entitled "Hygiene in Pickle and Sauce Factories" has recently been published by the Food Manufacturers' Federation.

The Federation considers that it is preferable that improvements in the handling of food should be encouraged by voluntary means. Pickle and sauce manufacturers have accordingly been requested to disseminate the information contained in this booklet among those holding responsible positions in their factories as well as among all the work-people who actually handle food materials at any stage of production. It is hoped that by this means, dangers to health through the consumption of possibly unhygienic foods will be minimised.

Hygiene in relation to factory buildings and services, manufacturing plant and equipment, raw materials, filling, pest control, and personnel generally, is dealt with in some detail.

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## OBITER DICTA

● The best way to get vegetables which look and taste like vegetables is to buy them out of a can.—*Eve Ireland, writing in the "Irish Times."*

● I am inclined to think that only a hungry world can be a peaceful world.—*Mr. J. V. Jacks, director of the Commonwealth Bureau of Soil Science.*

● There isn't time to fiddle with sterilisation and catching bugs when 25 blokes outside are screaming for their beef and two veg.—*A café proprietor, in a recent B.B.C. Broadcast.*

● There is one thing that has no excuse under heaven. You can find an alibi for burnt toast, or over-done steak, but for weak, miserable, ashamed coffee, there is no justification whatever.—*Mrs. Marguerite Patten.*

● After the last debate on agene and fluorine, I was reading some American literature; I found that one result of adding fluorine to water supplies was Communism!—*Lord Webb-Johnson, speaking in the House of Lords.*

● When fat is freed for the baker it will also be freed for the housewife, and the big fat manufacturers will be prepared to spend thousands of pounds to persuade her to make her own cakes.—*Mr. Norman Little.*

● Coal, that universal provider which already gives us heat, light and raiment, now looks like serving us with edible fats as well; and it can only be a matter of time before the chemists offer us bread from a stone.—*Extract from "The Prosings of Podalirius."*

● It is my hope that there will come a day when everyone will have not only one chicken in the pot on Sunday, and two cars in every garage, but also two quarts of milk for every human being every day, everywhere.—*Dr. J. M. May, in a paper read before the first World Congress for Milk Utilisation.*

● The precision with which Major Lloyd-George, the Minister of Food, presented his supplementary estimate of £35,300,000, mainly for sugar and eggs, made it all seem as simple as a recipe for Yorkshire pudding, but by the time Mr. Willey had stirred up the ingredients the result was more like an amateur's omelette.—*"The Times."*

## Pilfer-proof Toilet Roll

In blocks of offices, factories, institutions, and public premises, it is claimed that as much as 60 per cent. of toilet paper is lost through wastage and theft.

Designed to cut down such waste, the Toilok toilet roll holder is a pilfer-proof fixture which releases only a short piece of paper at a time, thus preventing unrolled paper becoming fouled on the floor and wasteful use of the paper.

The roll, once inserted, cannot be removed until exhausted. Any make of roll may be fitted; but Toilok rolls of special quality tissue are supplied by the makers, R. Sculthorp and Co.

# World Food News

## FORTHCOMING EVENTS

### French Trade Exhibition

The Exhibition of the Food Industry and Trade Equipment will take place in Paris in November, 1954, together with the exhibition of packing, handling, bottling, and dairy equipment.

### Congress on Surface-active Agents

The members of the Trade Association *Chambre Syndicale Tramagras* have decided to organise a first World Congress on Surface-active Agents, to be held from August 30 to September 3, 1954, at the Sorbonne, under the Presidency of Prof. Trefouel, Director of the Institut Pasteur.

The President of the Scientific Committee is Prof. R. Fabre, Dean of the Faculty of Pharmacy at Paris University.

Further information may be obtained from the *Secretariat Général du Ier Congrès Mondial de la Detergence*, 70, Champs-Elysées, Paris (8). Telephone: BALzac 05-10.

### Meat Hygiene

At the World Health Organisation and Food and Agriculture Organisation conference on meat hygiene held at Copenhagen, 45 experts from 22 nations discussed ways and means of maintaining the quality of meat, of obtaining an improved meat control, and of improving protection during storage and transport.

### Hybrid Maize Conference

The International Conference in Belgrade on Hybrid Maize, organized by the Food and Agriculture Organisation, ended its work on February 13. Observers and delegates from about 20 countries attended the meeting.

The Conference recommended the use of hybrid maize seed which in 1953 alone was said to have increased the value of maize production in 20 countries by about 40,000,000 dollars. It also recommended the supervision of hybrid seed production and the adoption of international regulations bearing on cultivation of trade in improved sorts of maize seed.

### Meat Agreement Extended

The Anglo-Argentine meat agreement, which lapsed on the last day of 1953, has been extended another six months. Agreement was reached at the Argentine Foreign Ministry after a meeting between Argentine and British negotiators.

An official *communiqué* on the trade protocol said total mutual trade during the period would amount to £101 million sterling and include the export to Britain of 119,000 tons of refrigerated meat and offals.

In addition, Argentina will export 8,900 tons of canned meat and £31 million worth of cereals, wool, and hides.

The agreement will bridge the gap between the old protocol and the end of the five years' trade treaty next June 30.

The Minister of State for the Board of Trade has announced that trade in Argentine meat will be restored to private hands when deliveries under the present contract have been completed.

### FAO's Director-General

Dr. P. V. Cardon (U.S.A.), unanimously chosen Director-General of the Food and Agriculture Organisation of the United Nations at the Seventh Conference Session, has now taken over the duties of his post from the retiring Director-General, Norris E. Dodd.

### Salmon from Canada

Britain has contracted to buy 5,000,000 dollars' worth of canned British Columbia salmon, according to the Fisheries Association of British Columbia.

The contract was negotiated by Sir Andrew Jones, representative of the British Food Ministry in Canada, Mr. J. M. Buchanan, chairman of the Fisheries Association, and Mr. R. T. Hager, vice-chairman of the Association.

The contract called for early delivery to Britain of 220,000 cases of salmon. The type of salmon was not disclosed.

### U.S. Meat Packers' Low Profits

Thirteen of America's leading meat packing companies last year sold slightly more than seven billion 39 million dollars' worth of products, on which they obtained a profit of less than one per cent., according to the American Meat Institute.

"According to a compilation of reports made by these slaughtering companies," said the Institute, "they obtained an average profit of 76/100ths of a cent per dollar of sales of products of all descriptions, including meat and by-products. These earnings were so small that if they had not existed there would have been no noticeable difference in the prices consumers paid for meat or what producers received for livestock.

"The earnings, as a percentage of sales, ranged all the way from a profit of 1·31 per cent. to a loss of ·87 per cent.

"These results were entirely unsatisfactory and insufficient to provide for needed expansion and improvement of facilities in the interest of consumers and livestock producers, and for highly desirable research in a number of directions."

### Need for More Food Research

That Americans must not be lulled into believing that the nation's vast surplus of food always would be a facet of American life, was the warning given by Dr. Victor Conquest, vice-president and general manager in charge of research for Armour and Company in an address given before the Kansas City section of the American Chemical Society. He said that intensive research was necessary to ensure that Americans always would have all the food they wanted.

"A great deal of research has been done on the subject of food supply," Dr. Conquest said, "and a great deal more is necessary. These food surpluses are only a temporary thing. We need to prepare for the time when our growing population and lessening fertility of soils make a surplus less probable."

Dr. Conquest, in discussing new trends in marketing food products, predicted that the butcher's shop soon would disappear from the American scene as the use of prepackaged foods increased.

### Food Preservation Research in Sweden

High frequency and other novel methods of preservation were demonstrated to the Swedish Minister of Commerce, John Ericsson, and a number of scientists at the recent inauguration of the new laboratory building of the Swedish Institute for Preservation Research in Gothenburg.

The Institute, which was started in 1948, has during the past five years carried on large scale researches in practically all fields of preservation technique under the leadership of Prof. Georg Borgström, an internationally known expert on food chemistry and food supply problems.

"Electric" preservation is to be the object of practical experiments to be carried out in collaboration with Chalmers Technical Institute, also of Gothenburg.

Among other forthcoming projects are investigations into new and improved methods of utilising Swedish fruit and processing waste into useful products. The Institute, which serves as a central laboratory for the Swedish food industry, is to take into use a factory building housing cold storage space and a department for packaging investigations.

## OVERSEAS ENQUIRIES

### Linseed Oil

H. E. Teifel and Co. (S.A.) (Pty.) Ltd., of 42, Marshall Street, Johannesburg, is desirous of contacting United Kingdom firms interested in exporting linseed oil.

United Kingdom firms interested in this enquiry should communicate direct with H. E. Teifel and Co., sending quotations and any other literature or useful information.

■

### Confectionery and Canned Goods

S. H. "Steve" Brody Company, 1807, East Olympic Boulevard, Los Angeles 21, have expressed interest in representing United Kingdom manufacturers of the following food products in the Western States: confectionery, canned hams, canned bacon, and canned sausages.

Firms who are interested in this enquiry are asked to write to the company direct by air mail, giving full details of the products offered together with catalogue, etc., quoting prices c.i.f. in U.S. dollars and cents.

In order to avoid the possibility of damage in transit, it is essential to ensure that any samples sent by post are carefully and securely packed. Duty is normally payable on samples imported into the U.S.A. unless the value does not exceed one dollar.

■

### Preserves, Confectionery, and Pickles

Browning-Harvey Ltd., of St. John's, Newfoundland, have expressed interest in acting as the exclusive agents in the Province, of United Kingdom manufacturers of preserves, particularly jams, sugar, and chocolate confectionery and pickles, who are not represented in Newfoundland.

Their interest is chiefly in the products in the cheapest price range. Volume sales of products of this kind are largely restricted to items of the lowest possible price and competition is severe.

United Kingdom firms who are interested in this enquiry should send literature, samples and price details direct to Mr. E. Ellis of the St. John's firm.

They are reminded that the commodities mentioned are subject to the Canadian Food and Drug Regulations Act and that all imports into Canada may be liable to Anti-Dumping duties.

■

### Agencies for Whisky

Mr. Chemouli, a director of Distillerie de l'Anisette Phenix, 8, rue Riego, Algiers, is desirous of representing a United Kingdom supplier of whisky.

United Kingdom firms interested in this enquiry should write direct by air mail to Mr. Chemouli submitting full particulars of their whisky, together with price lists and trade literature. The delivery position should also be stated.

Michel Antoine Kardous, rue Salhieh, Damascus, wishes to represent a United Kingdom supplier of Scotch whisky in Syria.

Offers of inferior young whisky are not acceptable and the enquirers have stipulated that the bottles shall bear a label stating that the whisky is bottled under Government supervision.

United Kingdom firms interested in this enquiry should write direct by air mail to Michel Antoine Kardous submitting full particulars of their whisky together with price lists. The delivery position should also be stated.

*All foodstuffs destined for the United States are subject to the United States Food and Drugs Administration Regulations.*

The Schenley decanter display.

### Fast-moving Decanter

A merchandising innovation consisting of a motion display that lifts the new Schenley Reserve decanter off the retailer's shelf and pushes it down into the customer's line of vision, has been devised. Called the 5-D Sellerama, this eye-catching display is being used in many U.S. markets.

It consists of a Lucite reproduction of the Schenley Reserve fall and holiday package, an operating arm, and a small motor. When set in motion, the operating arm moves the decanter out from the shelf and down, revealing a card which reads: "Give! Serve! Enjoy! Schenley." At the end of each cycle the decanter moves back to its original position on the shelf. This merchandising aid is helping to lift sales figures for the Schenley Reserve Decanter to record heights in all parts of America.

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### Report from Whaling Fleet

The Norwegian whaling fleet in the Antarctic reports that from January 2, when the season opened, up to January 16, production of whale oil was 187,823 barrels, equal to about 31,000 tons. Up to January 17 last year, production was 169,270 barrels, but there were then only seven Norwegian expeditions operating as against nine this year. On the other hand, this year's expeditions are using fewer catcher boats, 93 compared with 100 last year.

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### Soviet Salmon for Australia

Australia is to import from the Soviet Union canned salmon and crab meat estimated to be worth 1,600,000 Australian pounds. The agreement will help to balance the two countries' trade account, which is running nearly 20 to one in Australia's favour.

Canned salmon from Canada, which was formerly Australia's main source of supply, has been scarce since the dollar shortage cut imports.

Soviet canned fish, though expensive, has been sold successfully in Australia on an experimental basis. Substantial quantities are expected to be available soon.

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### Denmark's Pig Population

The adviser of the Co-operative Sealand Farmers' Unions, Mr. Harold Kristensen, has recommended curtailment of Denmark's pig population at the annual meeting of the Union.

It must be feared, he said, that Danish bacon and pork production will in future prove too big in relation to existing marketing possibilities. All indications are that the British market is practically satisfied, and a further increase in Denmark's pig population and bacon production may consequently entail sales difficulties if secondary markets do not prove stable.

Therefore, it would be a better policy to bring the pig stock slightly down rather than to increase it, but with the present favourable ratio between grain and bacon prices, a voluntary reduction would hardly be expected.

Commenting on Danish pig breeding in 1953, Mr. Kristensen said there was an increase in pig stock and a large increase in production and exports. Thus in 1953 exports at 247 million kilos were about 30 per cent. higher than a year earlier. Of this total, 94 per cent. or about 231 million kilos went to Britain. Other recipients were the Soviet Union, West Germany, Sweden, France, and a number of other countries.

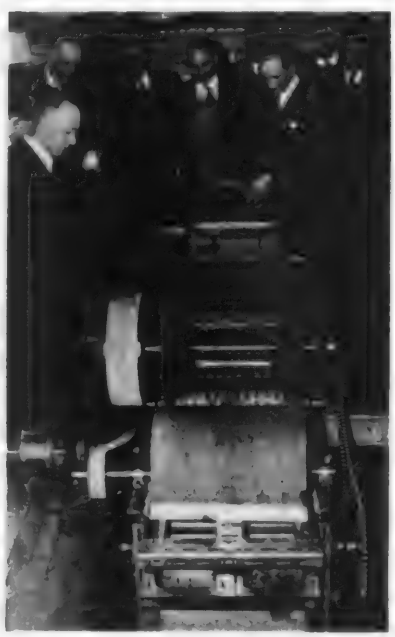
# Seaweed Processing in Ireland

## USED FOR MEAL AND MANUFACTURE OF ALGINATES

A new Irish company, Seaweed Ltd., engaged in the manufacture of seaweed meal, and the grinding and packeting of carrageen, has commenced operations at Kingston, Taylor's Hill, Galway. When production reaches its peak, 1,500 tons of the meal, a valuable cattle food, will be manufactured annually and 100 workers will be employed. A special furnace for drying the weed will consume daily from five to 10 tons of machine-turf, Ireland's national peat fuel, after it has been processed for industrial purposes.

The factory purchases its raw material from people on the coast where, each June, the seaweed is scythed from rocks along the Atlantic foreshore with sharp, broad-bladed knives. Each boat harvests a daily total weight of some three tons of weed. The edible seaweeds, before being used on a commercial scale, went into feeding mixtures for farm animals, and the pick of them on to the family dinner table, the Purple Laver giving a tang of a faintly acid flavour to mutton, the broad, wafer-thin leaves of the Green Laver making a spicily-flavoured biscuit.

Carrageen moss is the best known of these seaweeds. Once used by coastal farmers as a cattle food and as a medicine to correct the diet of cattle grazed on the bleak hill farms above the sea on Ireland's west coast, the medicinal qualities of this iodine-rich moss were discovered some 40 years ago. Today, £700 in a season can be earned by groups of 10 or 12 Irish families who combine to harvest the carrageen beds in their village.



The carrageen cleaning and grading machine can handle 2½ lb. of moss per minute.

A new machine, designed by Mr. K. W. O'Hara, B.Sc., A.M.I.E.E., for cleaning and grading carrageen moss has been built at the Institute of Industrial Research and Standards, Glasnevin, Dublin. Still in the experimental stage, the machine is capable of handling about 2½ lb. of moss per minute.

The carrageen moss production potential of Ireland, even without any attempt to improve on existing harvesting methods, was proved during the war years to lie between 600 and 700 tons a year. Before the war, the average production a year was about 300 to 350 tons, and, after the peak years of the war, production settled back to this level for four or five years. Since 1950, the level has dropped and at present it is not higher than 250 tons a year.

A very selective market is available in the United States and the introduction of new mechanical methods for cleaning and grading the moss should enable the rigid standards required by importers to be met.

During the autumn, the Atlantic tides hurl masses of another type of seaweed above high-water mark. Torn from its moorings on the deep-water rocks, this weed, called the *Laminaria*, litters the beaches with its 12 ft. long knobbly stems which are as thick as a man's arm. The rubbery rods are collected and spread to dry in the wind along the loose-stone walls, where they lie until the factory buyer comes to collect them for about £5 per ton.

As yet, Ireland has only begun to exploit the industrial possibilities of *Laminaria* which, when kiln dried and pulverised, provides the basis for alginates.

Another company, Alginate Industries (Ireland), is also engaged in processing seaweed at Kilkerrin, Connemara, where meal is produced from sea-rods. In the annual report of this company, issued in February, 1954, it is stated that in spite of a reduction in the amount of sea-rods processed at the factory, full and continuous employment was maintained by operating the plant for a portion of the year on *ascophyllum*, a different type of seaweed. A net profit of £1,972 was realised in the year's sale. As in previous years, the entire production was exported.

A total of almost £10,000 was distributed among the gatherers of sea-rods and *ascophyllum* along the western coast of Ireland, while the direct and indirect wages amounted to £8,000.

These two alginate factories are situated in the depressed areas of Western Ireland.

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### Transparent Drawer Cabinets

The production of a complete line of "See-Thru" drawer cabinets for small-parts filing and storage for industrial and other purposes has been announced by the General Industrial Co. of Chicago.

The popular size consists of 20 transparent plastic spillproof drawers in a welded steel cabinet. Adjustable drawer dividers and identification labels are included.

Other drawer units now in production include models ranging from eight to 128 drawers, models with larger size or metal drawers, and portable models with carrying handles; over 750 combinations can be supplied.

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### India's Food Production

The latest authoritative review of India's food position indicates self-sufficiency not only in rice but also in coarse grains and, to a great extent, in wheat. There will be imports of rice and wheat in 1954 only to build up a reserve which will depend on the price factor only.

Production of coarse grains in 1951-52 amounted to 15·7 million tons and in 1952-53 it rose to 17·4 million tons. This year's yield is expected to exceed even this figure considerably. There are at present 130,000 tons of coarse grains with the Government.

As regards wheat, present stocks are estimated at 500,000 tons in the Central Government depots and over 300,000 tons with State Governments. These stocks will, it is stated, suffice for several months. Imports will, therefore, be decided upon only to build up a reserve, provided prices are favourable to India.

So far as rice is concerned, the authorities state that India has attained self-sufficiency. As against an import of 700,000 tons in 1951-52, the import in 1953 was 190,000 tons, while in the current year the country's requirements are expected to be fully met by internal supplies.

Exportable rice surpluses from the States are estimated at 1,400,000 tons this year, which is 200,000 tons more than the aggregate demands of the deficit areas. In spite of the self-sufficiency in rice, controlled distribution is likely to continue, at any rate for a considerable part of the year.

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### Irish Easter Eggs

Irish manufacturers have been sending large consignments of Easter Eggs to London, Manchester, Bristol, and Plymouth, the biggest consignment consisting of 358,000 eggs for Manchester.

The firms secured the orders against competition from Czechoslovakia and other European countries.

### South African Fish Meal

According to a report by the Board of Trade and Industries, the fish meal produced in South Africa is good on an average showing, and is reported to have been well received by American and other overseas buyers. None the less, in the past it has not met all the requirements of the South African or American Governments.

Tests carried out by the Fishing Industry Research Institute during the 1950-51 season disclosed a relatively high average protein content of 64·6 per cent., but individual samples showed a variation between 53 and 71 per cent. Moisture contents ranged between 1·9 and 16·1 per cent., and averaged 7·6 per cent. Fat contents were between 3·8 and 14·5 per cent., and averaged 9·7 per cent.

In the case of oil content even the average figure, although below the officially determined maximum, was nearly double the percentage considered most desirable in the United States. The fact that there is room for improvement is also disclosed by the Board's cost investigation.

Generally, the quality of the meal can be improved by the retention or reintroduction into the meal of the solubles contained in the "stick-water." According to some experts, this will have to be done—and is being done in Norway—in order to withstand the threat from synthetic feeds. In the Union, the oil is priced on the basis of its iodine content, the standard being 180. In the overseas markets, moisture, impurities, and free fatty acids are also taken into account.

During the 1950-51 season, 22 samples of crude oil analysed in the Union had average iodine values of 185, the variation being between 160 and 207. Free fatty acids varied from 0·73 to 3·6 per cent., the average being 1·8 per cent. Moisture content ranged from less than 0·1 to 0·9 per cent., averaging 0·2 per cent. Insoluble impurities were generally less than 0·01 per cent., with a maximum of 0·05 per cent. South African pilchard oil has a high iodine content. In 1950-51, the analysis just quoted disclosed average iodine values about 10 per cent. higher than those of the previous season.

# News from the Ministries

### Food Standards Committee

Miss E. Walker, O.B.E., an Assistant Secretary, Ministry of Food, has been appointed a member of the Foods Standards Committee in place of Mr. N. R. C. Dockeray; Mrs. J. J. Tait has been appointed one of the Joint Secretaries of the Committee in place of Mr. C. Ellis.

### Dried or Dehydrated Vegetables

The Board of Trade give notice that they are considering an application for increased import duties on the following dried or dehydrated vegetables: beans, beet, cabbage, carrot, cauliflower, celery, leek, parsnip, potato, spinach, swede, turnip, and mixed vegetables.

### New Arrangements for Milk Marketing

Marketing powers are to be restored to the four Milk Marketing Boards on April 1.

From that date, the method of providing a price guarantee for milk under Part I of the Agriculture Act, 1947, will be on a new basis which has been agreed with the National Farmers' Unions and the Milk Marketing Boards. In Great Britain, the guarantee will be implemented through financial arrangements with the Milk Marketing Board for England and Wales, and with each of the three Scottish Milk Marketing Boards. In Northern Ireland, corresponding arrangements will be operated by the Ministry of Food through the Ministry of Agriculture for Northern Ireland.

In the light of each Annual Review a guaranteed average price will be determined for the United Kingdom. This will be broken down on an agreed basis into a guaranteed price related to a standard quantity of milk for each of the five marketing areas in the United Kingdom. These areas are England and Wales, the three Scottish marketing areas, and Northern Ireland.

In each area, the guaranteed price will be broken down into a higher price for a primary proportion and a lower price for the remainder of the milk. The primary proportion will be a percentage (determined annually) to be applied to total sales off farms during the year to which the guaranteed price applies, or, if such sales exceed the standard quantity, to the standard quantity.

The higher price will be a firm guarantee for the quantity of milk in the primary proportion; on the remainder of the milk, each Board will be guaranteed the lower price plus or minus half the difference between this and the actual average net price realised by the Board for all manufacturing milk, *i.e.* a profit-and-loss sharing arrangement between the Government and the Board on all milk in excess of the primary proportion.

The Government will make up any deficit between the net revenue from the sale of milk by each Board and the amount to which each Board would be entitled under the above formula (which includes the profit-and-loss sharing arrangements).

The standard quantities and the primary proportions for the different marketing areas will be subject to revision in the light of each Annual Review. One of the main factors which will be used as a guide in reviewing these will be an increase or decrease in the level of sales for liquid consumption in the preceding year, but all relevant factors will be taken into account.

These arrangements will provide the Boards with an incentive to realise the best prices for manufacturing milk, and to increase liquid sales.

As stated in the White Paper, the Government will continue to be responsible for approving the level of prices and distributive margins for milk sold for liquid consumption so long as there is an element of consumer subsidy. When the Government no longer determines maximum prices for liquid milk, the Boards, after having consulted the Consumers' Committees, will be required to give Ministers advance notice of changes proposed in the prices of liquid milk.

The machinery for settling disputes between the Boards and the manufacturing and distributive interests has been the subject of negotiations between the parties concerned, including the National Farmers' Unions. As a result, Joint Committees of representatives of the Boards and the trade interests will be established in each area. These Committees will deal with all matters of common concern. In the event of a Committee failing to agree on any particular issue, the matter will be referred to an independent consultant whose decision both parties have agreed to accept.

### Swedish Bacon Agreement

An agreement has been made between the United Kingdom Government and the Swedish bacon factories for a new bacon contract covering the period from January 1, 1954, to January 1, 1955.

Under the new contract the United Kingdom will buy not less than 6,000 tons and not more than 8,000 tons during the year.

The price is 237s. 6d. per cwt. c. and f. U.K. port.

### Welfare Foods Appointment

Mr. J. Roberts, C.B.E., who resigned his appointment as Director of Starch at the end of 1953, has agreed to return to the Ministry of Food on a part-time basis as Director of the Welfare Foods (Procurement) Branch. This Branch assumed responsibility for the procurement, blending, and bottling of orange juice for the Welfare Foods Service on March 1, 1954.

Mr. Roberts will continue to act as the Minister's adviser on starch.

# Information and Advice

**This Service is available to subscribers to FOOD MANUFACTURE. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.**

### Ham Cure for the Tropics

B.6919. *Could you please supply us with a formula for a ham cure suitable for use for hams to be despatched to hot climates?* (N. Zealand)

The following formula may be used as a basis for trial: Well rested hogs of 100 to 120 kg. should be selected, and a dry cure should be used, made up as follows:

| | *lb.* |
|---|---|
| Sodium nitrate | 2 |
| Sugar | 4 |
| Salt | 100 |

The mixture is rubbed into the hams several times over a period of five weeks, the hams being held at about 40°F. and stacked five high. Any hams which show signs of slime should not be used for this particular purpose. After curing, the hams are washed in cold running water, sometimes for as long as 24 hours. They are then thoroughly dried until all traces of moisture have disappeared, after which they should be smoked steadily at a temperature of 15°-17°C. for a period of 14 days.

### Salad Cream Problems

B.6926. *We are engaged in making salad cream, and are experiencing some difficulty with separation, as in some cases, a watery layer of about ¼ in. in depth appears at the bottom of a 6 oz. bottle, whereas other bottles remain in good condition for some months. We use gum tragacanth at the rate of 8 lb. 12 oz. for 100 gallons of the finished product, and have about 2 per cent. egg yolk and 35 per cent. oil; the acidity of the product is 1·3 per cent. We are using two machines, a mixer and an emulsifier. Can you give us any advice on overcoming this problem?* (Ireland)

It appears that the amount of egg yolk in the salad cream is too low both as regards S.R.O. requirements and the achievement of a stable emulsion. Two per cent. egg yolk is equivalent to slightly over 1 per cent. egg-yolk solids, whereas the statutory minimum requirement is 1·35 per cent. egg-yolk solids. As a corollary of the too low yolk position, the amount of oil is somewhat excessive, for although a high content of oil is normally to be desired, a fair proportion of a real emulsifying agent is necessary to "bind" it. The amount of gum tragacanth is satisfactory, but it is not an emulsifying agent in the full sense of the word. It stabilises largely in a mechanical manner by slowing up the upward and downward movement of the liquids of varying density. The lecithin and cephalin fraction of the egg yolk is responsible for achieving real stability in this product.

Apart from the two points mentioned there is the method of preparation. Before emulsification, it is absolutely necessary that the mixture should be completely homogeneous, *i.e.* in the form of a coarse emulsion. To achieve this it is necessary to run the oily phase very slowly into the aqueous fraction so that it is taken up completely and does not form a pool in the latter while the mixing proceeds in the machine.

Other points that have bearing on the emulsification are:

(*a*) temperature of the mix at the time of emulsification; this should not be higher than about 110°F.;
(*b*) efficiency of the emulsifying machine;
(*c*) impairment of emulsifying properties of egg yolk by overheating prior to the emulsification process.

Briefly, we would advise you to increase the egg yolk as much as possible and to make sure that the mixture is homogeneous and not too hot when it is put through the emulsifier. It has been found that an electrical centrifuge is a very useful adjunct for testing out emulsions, for a stable one may be "swung" for hours without noticeably breaking.

As regards acidity, this will depend on the water content of the product. If, for instance, the article contains 35 per cent. oil, 15 per cent. sugar, and 5 per cent. other non-aqueous materials, this would leave 45 per cent. aqueous portion, so that the suggested acidity in this case (1·2 per cent. to 1·3 per cent.) would produce an acidity in the water fraction of about 2·9 per cent. instead of the desired 3·5 per cent. Some firms do have acidities below this, but they are definitely taking chances as regards keeping properties.

### Peppermint Lumps

B.6943. *Would you let us have a formula for peppermint lumps of a toffee type?* (London)

The following formula may be used as a basis for trial:

| | *lb.* | *fl. oz.* |
|---|---|---|
| Corn syrup | 60 | — |
| Skimmed condensed milk | 10 | — |
| Tate's Grade 20 pieces | 35 | — |
| Hard fat | 2½ | — |
| Peppermint oil | — | 1½ |

The ingredients are thoroughly mixed, with the exception of the peppermint oil, prior to cooking, placed in a steam stirring pan, and cooked to 263°F. The batch is poured on a water-cooled oiled slab and transferred to a pulling machine in motion, peppermint is added gradually, pouring on the batch carefully. The mass is allowed to aerate until light, passed through a cutting machine and wrapped, when cool, in waxed paper on a twist wrapping machine. Alternatively, the batch may be placed in a vertical batch feeder and passed through a plastic wrapping machine.

### Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.6902. *Canned soups.* (Lancs.)
B.6904. *Vacuum packs for foods.* (Holland)
B.6907. *Jam manufacture.* (Devon)
B.6908. *Papain manufacture.* (Finland)
B.6909. *Popcorn manufacture.* (Lancs.)
B.6910. *Monosodium glutamate.* (Peru)
B.6911. *Lecithin.* (Australia)
B.6913. *Bacon and ham curing.* (Worcs.)
B.6915. *Bottle ringing equipment.* (Australia)
B.6916. *Synthetic sausage casings.* (Canada)
B.6918. *Table salt.* (Ceylon)
B.6922. *Can vacuum sealing equipment.* (Scotland)
B.6923. *Mincemeat equipment.* (Leics.)
B.6924. *Milk cartons.* (London)
B.6925. *Apple pectin.* (Northumberland)
B.6927. *Carton packing service.* (Scotland)
B.6928. *Glacé cherry packing equipment.* (London)
B.6929. *Vegetable washing equipment.* (Kent)
B.6932. *Honey mixing and pumping equipment.* (Cambs.)
B.6934. *Flour confectionery packs.* (Ireland)
B.6935. *Meat bandsaws.* (Lincs.)

# Recent Patents

703,897. MIAG MUEHLENBAU UND INDUSTRIE GES.: Apparatus for cleaning material to be milled, especially semolina.
704,064. VITAMINS, LTD.: Vitamin preparations.
704,209. ARMOUR AND CO.: Process for recovering protein from whey.
704,232. GIRDLER CORPORATION: Method and apparatus for deodorising oils and fats.
704,305. BRITISH THOMSON-HOUSTON CO., LTD.: Food mixers.
704,549. JEWELL, P. S., and KING, J. G. T.: Production of ingredients for foodstuffs.
704,591. AKTIEBOLAGET SEPARATOR: Method of continuously refining fatty oils.
704,668. BLACKWELL, G. W.: Pasteurisation of milk and heat-exchangers therefor.
704,680. AKTIESELSKABET DE DANSKE SUKKERFABRIKKER: Process for removing impurities from sugar juices.
704,967. DISTILLERS CO., LTD.: Baking yeast.
705,001. SCHÖTTLE, R. (trading as SCHÖTTLE KOMMANDIT-GES., R.): Fruit pulp centrifuges.
705,059. CLARK, I. M. (Fieguth, M.): Process for preparation of an edible composition from honey and milk.
705,122. NAAMLOOZE VENNOOTSCHAP STEROVITA MELPRODUCTEN: Method of preparing yoghourt in bottles.
705,138. HOBART MANUFACTURING CO.: Shrimp deveiner.
705,489. MARS, LTD., HOUGHTON, A. A., and SIMMENS, L.: Protein-containing materials suitable for use in food products.
705,536. ABBEY, A. (Armour and Co.): Processes for removing catalysts from hydrogenated oils.
705,592. BENSMANN, C. H. N.: Method and apparatus for regenerating used mineral or vegetable oil.

## ABSTRACTS OF BRITISH PATENTS

### Mixing and Kneading Machine

In the mixing and kneading machine described, the mixing, stirring, kneading, and agitating vaned elements are designed and arranged so as to avoid any dead space and enabling such a co-operation of the members that the mass parts will be scraped off due to their mutual and reciprocal action, thus avoiding any adhesion of unmixed mass parts.

Even a protective covering for the bearings is omitted, because all working members enter into and receive their drive from above the container. The working members encounter each other due to the opposite directions of their motions, thereby mixing, compressing, cutting, continuously loosening, and propelling the mass across the container, thus ensuring an intimate mixing and kneading of the whole mass.

Stirring and agitating members which rotate concentrically in the container are driven by means of a ring disposed concentrically above the container. A stirring element is rotatably driven by a shaft passing eccentrically through the ring.

The eccentrically mounted stirring member is provided with both a long and a short arm so as to enable the arms to pass through the whole centre area of the container.

703,032. *Reinhold Moller.*

### Disintegrating and Mixing Foodstuffs

The invention relates to improvements in machines intended for disintegrating and mixing foodstuffs, more especially vegetable foodstuffs.

Its object is to increase the capacity of such a machine to render it usable in the large kitchens of restaurants, hospitals, and similar institutions, as well as in canning factories and similar foodstuff industries.

The machine is substantially intended for cutting foodstuffs into slices, strips, cubes, or the like.

703,383. *Ernst Otto Sigfrid Hall.*

### The Handling of Biscuits

There are many occasions in the handling of biscuits when it is desirable, or useful, to spread out biscuits which are fed to a hopper into a plurality of lines of biscuits which are then taken away by means of band conveyors or other devices to further machines where an additional operation is performed on the same. Notably is this the case where biscuits are automatically fed to a hopper from a band even with a high rate of output.

The chief object of the invention is to provide simple and effective means of spreading the feed of biscuits from a hopper into a plurality of lines of biscuits.

703,833. *Wright's Biscuits Ltd.*

### Fat Content of Cream

In this specification there is claimed a method for the continuous production of cream of constant fat content in which milk, or less concentrated cream, is divided in a centrifugal separator into cream and skim milk. The values of the electrical resistance or of the dielectric constant of both the cream and the skim milk discharged from the centrifugal separator are continuously determined and from these two values there is derived a value for the fat content of the cream, and the setting of the centrifugal separator is adjusted to maintain the last value constant.

The invention is concerned with a particularly suitable embodiment of this method and an arrangement to carry it out.

The cream concentrating power of the separator is regulated so that the ratio of the specific electric resistances of the cream and skim milk discharged from the separator corresponds to a desired ratio found empirically.

695,506. *Aktiebolaget Separator.*

### Drying Powdered Material

A method is described of drying powdered or other more or less finely divided material wherein the material is upwardly conveyed by means of a current of hot air through a path of zig-zag form characterised in that each limb of the zig-zag path is upwardly inclined and is of such a length that a vertical projection of its inlet end does not overlap its outlet end and further characterised in that heat is applied externally to the path.

By arranging the zig-zag path so that it progresses continuously upwards but with several changes in direction and making the limbs of such a length that a vertical projection of the inlet end of one limb does not overlap the outlet end, *i.e.* of such a length that straight-line flow through two succeeding limbs is impossible, intimate and prolonged contact between the walls of the path, the hot air which is functioning as a conveying and drying medium and the material flowing through is ensured.

Moreover there results a tendency for the larger and heavier particles which need more drying than the lighter ones to proceed along the path at a slower rate, and there is a certain amount of repetitional circulation particularly at or adjacent to the points of change of direction of flow.

566,170. *Frederick Jonathan Fison and Chivers and Sons, Ltd.*

### Protein Food Products

A process is described for the manufacture of a food product which includes the steps of preparing filaments of protein and applying to the filaments a binder. It relates to the manufacture of products which will have the flavour, colouring, taste, and "chewiness" of meat and which need not contain either actual meat or animal flesh.

Any protein capable of being made into filaments may be used in this process, for example, oil seed proteins, such as soya bean, or groundnut protein, casein, and proteins obtained from gluten, fish, or maize.

699,692. *Robert Allen Boyer.*

## ABSTRACTS OF FOREIGN PATENTS

### Extrusion of Sausage Meat

Sausage meat is contained in a fluid-tight pliable bag contained within a stiff-walled chamber. Hydraulic pressure is applied through ducts to the space between the stiff-walled chamber and the bag so as to press it on to the pliable bag and thereby extrude the sausage meat through one or more nozzles.

German 867,204. *Hermann Walser.*

### Cooking and Cooling Apparatus

Vessel applicable as either cooking or cooling apparatus has a casing open downwardly and closed upwardly which serves simultaneously as a supporting base and carrier for the vessel. When employed as a cooler the vessel is reversed in position so that the cover serves as the base plate and the casing, thus placed open upwardly and closed downwardly, serves for the reception of the cooling means.

German 856,692. *Karl Trabert.*

### Regulating Liquid Flow

A device for regulating the quantity of liquid in a heating coil plant consists of the disposal of an overflow receptacle in the liquid ducts of the plant. The alteration in height of the surface of liquid in the receptacle controls the flow of current through the coil. The coil controls a valve which in turn defines the path of flow of liquid into or out of a chamber containing a diaphragm valve in the liquid duct. The current to the magnet coil is supplied by an electric battery, the height of the surface of the liquid controlling the opening and closing of the battery circuit.

German 867,347. *Otto Tuchenhagen.*

# Trade Marks

**BAKQUIP.**—720,822. Artificial cream for food. **Bakcos, Limited,** 159, Hammersmith Road, Hammersmith, London, W.6; Manufacturers.

**HYDRANGEA.**—720,872. Flour. **Lake of the Woods Milling Company, Limited** (a Joint Stock Company organised under the laws of the Dominion of Canada), Place D'Armes, Montreal, Canada; Millers.

**TIPOMELK.**—720,879. Milk and milk preparations (for food). **Esko Products, Limited,** 7a, Diamond Gardens, Finaghy, Belfast; Manufacturers.

**PARACHUTE.**—721,021. Flour. **Howard Jackett and Company Pty., Limited** (a Company incorporated under the laws of the Commonwealth of Australia), 534, Bridge Road, Richmond, E.1, Melbourne, Australia; Flour Millers.

**BUTTABONS.**—721,031. Non-medicated sugar confectionery, chocolates and chocolate; all containing butter. **Cowan's, Limited,** 49, Solway Street, Glasgow, S.E.; Manufacturers.

**CHEDDROLL.**—721,062. Cheese. **Wilts United Dairies, Limited,** Bythesea Road, Trowbridge, Wiltshire; Manufacturers.

**FLYING BIRD.**—721,130. Dairy products (for food). **Aarhus Oliefabrik A/S** (a Company incorporated under the laws of Denmark), Aarhus, Denmark; Manufacturers.

**MOKA-RIS.**—721,171. Moka coffee and coffee blends consisting principally of moka coffee. **Riservato Partners, Limited,** 4, Redburn Street, London, S.W.3; Manufacturers and Merchants.

**COOLIE.**—721,209. Meat; fish, poultry, and game (none being live); and fruits and vegetables, all being preserved, dried or cooked foodstuffs. **Graham Keith Company, Limited,** Clarence House, 8, Arthur Street, London, E.C.4; Merchants.

**UNECOL-HY.**—721,240. Edible oils and edible fats. **The United Yeast Company, Limited,** 80, Miller Street, Manchester; Manufacturers and Merchants.

**FRUTESCOL.**—721,278. Fruit flavouring powders and fruit essences (not being essential oils), all for use by bakers and confectioners. **George Otto Thompson,** Weekley, Kettering, Northamptonshire; Manufacturer.

**STORMY PETREL.**—721,345. Canned fish, canned meats, canned fruits, and canned vegetables. **Selander and Bylin (Pty.), Limited** (a Limited Liability Company organised according to the laws of the Union of South Africa), 30, Hout Street, Cape Town, South Africa; Manufacturers.

**CHIFFON.**—721,804. Cakes and cake mixtures. **H. J. Green and Company, Limited,** Aldrington Works, Portland Road, Hove, 3, Sussex; Manufacturers.

**MAVOURNEEN.**—722,026. Cakes, biscuits (other than biscuits for animals) and flour confectionery. **Gateaux, Limited** (a Limited Liability Company organised under the laws of the Republic of Ireland), Finglas, Dublin, Ireland; Manufacturers.

**UMPINE.**—722,209. Canned pineapple. **United Malayan Pineapple Growers and Canners, Limited** (a Joint Stock Company organised under the laws of the Colony of Singapore), 105, Beach Road, Singapore, 7; Food Canners.

**SAXOL.**—722,524. Artificial sweetening substances. **Harrogate Pharmaceuticals, Limited,** Golden Mile Works, Bridgend, Glamorganshire; Manufacturing Chemists.

**HAMLET.**—722,668. Jams; and fruits and vegetables, all dried, frozen or canned. **David Graaff Foods, Limited** (a Company incorporated under the limited liability laws of the Union of South Africa), 307-327, Groote Kerk Building, Adderley Street, Cape Town, Union of South Africa; Manufacturers.

**FRUDOTS.** — 722,759. Non-medicated confectionery. **Stotherts, Limited,** Albion Works, North Road, Atherton, near Manchester; Manufacturers and Merchants.

**DAIRYGLEN.**—722,871. Jams, marmalade, and jellies (for food). **London Grocers, Limited,** 11, Dod Street, London, E.14; Merchants.

**LEVUXIN.**—722,919. Substances used in the making of bread and other farinaceous baked foodstuffs for improving the quality and keeping properties thereof. **Frisana Products, Limited,** 59, Avondale Road, Bromley, Kent; Manufacturers.

**BUXLEY.**—722,959. Non-medicated confectionery. **Buxley Trading Company, Limited,** 132, Southwark Street, London, S.E.1; Merchants.

**ELIZABETH ANN.**—722,960. Canned vegetables, canned fruits, and canned fish. **Norman L. Waggoner, Limited,** 37, Eastcheap, London, E.C.3; Merchants.

**NIOBE.**—722,984. Dried fruits. **Ciclitira and Company, Limited,** 28, Martin Lane, London, E.C.4; Importers.

**WHITE SATIN.**—723,015. Flour. **John F. Cameron and Company, Limited,** 8, South College Street, Aberdeen; Flour Importers.

**SOLEXATE.**—723,150. Edible oils and fats. **Marine Oil Refiners of Africa, Limited** (a Joint Stock Company organised under the laws of the Union of South Africa), Dido Valley, Simonstown, Union of South Africa; Manufacturers.

**ADVITACON.**—723,269. Chemical substances for use in the course of the manufacture of foodstuffs. **Advita, Limited,** 2, Kingscote Street, Tudor Street, London, E.C.4; Merchants.

# New Companies

**Ackrill's Confectionery, Limited.** (525804.) 268A, Vicarage Road, Kings Heath, Birmingham, 14. To carry on business of manufacturing confectioners. Nom. cap.: £2,000 in £1 shares. Dirs.: H. A. Ackrill and Caroline E. Ackrill, 763, Pershore Road, Birmingham, 29.

**Enfield Confectionery Company (Blackpool), Limited.** (525862.) Dover Road, Blackpool. To take over business of manufacturing confectioners carried on as "Enfield Confectioner Company" at Blackpool. Nom. cap.: £2,000 in £1 shares. Permt. dirs.: A. Singleton, 15, Preston Old Road, Marton, Blackpool, and R. Rolinson, 56, Chislehurst Avenue, Blackpool.

**Confiserie de Paris, Limited.** (525879.) To carry on business of manufacturers of and dealers in chocolates and sweets. Nom. cap.: £100 in £1 shares. Dirs.: M. Perelmuter and G. F. Moser, 41, Beaufort Gardens, Kensington, London, S.W.3.

**Broadwey Flour Mills, Limited.** (527239.) Mill Street, Broadwey, Weymouth, Dorset. Nom. cap.: £3,000 in £1 shares. Permt. dirs.: J. G. Baker, Four Chimneys, Upwey, Weymouth; V. W. Crawford, 24, Weyview Crescent, Broadwey, Weymouth, and P. H. Flint, Hurstfield, Upwey, Weymouth.

**Lion's General Food Products (England), Limited.** (527440.) Oxford Circus House, 245, Oxford Street, London, W.1. To carry on business of manufacturers of and dealers in foodstuffs of all kinds. Nom. cap.: £10,000 in £1 shares. Dirs.: U. Th. Joachim and V. B. Christofides, Nicosia, Cyprus; E. Dee, 245, Oxford Street, London, W.1, and M. Bandler, Nicosia, Cyprus.

**H. E. Simms and Company (Leicester), Limited.** (527547.) 36, Evington Road, Leicester. To carry on business of confectioners, manufacturers of, and dealers in sweetmeats, toffee, and candy. Nom. cap.: £1,000 in £1 shares. Permt. dirs.: H. E. Simms, 2, St. Mary's Avenue, Leicester; H. A. Simms, 28, Belvoir Drive, Leicester, and Grace E. Simms, 39, Cromer Street, Leicester.

**Surrey Frozen Foods, Limited.** (527565.) 7, Clarendon Place, King Street, Maidstone. To carry on business of importers, exporters, and manufacturers of and dealers in frozen foodstuffs and comestibles, and iced confections and products. Nom. cap.: £2,000 in £1 shares. Dirs.: F. S. Burgess, The Forstal, Lenham Heath, Kent; D. Sparks, 107, Higher Drive, Banstead, and F. K. Berry, 7, Clarendon Place, King Street, Maidstone.

**Grafton Food Products (Sales), Limited.** (527806.) 12, Hillside Avenue, Wembley, Middlesex. Nom. cap.: £100 in £1 shares. Dir.: W. H. Weiner, 54, Troy Court, High Street, London, W.8.

**Adler's British Halva, Limited.** (527903.) To carry on business of manufacturers of and dealers in Halva Talin, cream of sesame seeds, sesame seeds both processed and unprocessed, chocolate and sugar confectionery, biscuits, and foodstuffs. Nom. cap.: £1,000 in £1 shares. Dirs.: not named. Subs.: A. Adler and Flora Adler, 60, Park Lane, London, W.1 (co-dirs.).

**Greifer Products, Limited.** (527932.) 69, Gloucester Place, London, W.1. To carry on business of manufacturers of and dealers in machines and machinery of all kinds, including confectionery manufacturing machinery and bakers' machinery. Nom. cap.: £100 in £1 shares. Dirs.: D. Greifer and Elsie Greifer, 11, Morden Court, London Road, Morden.

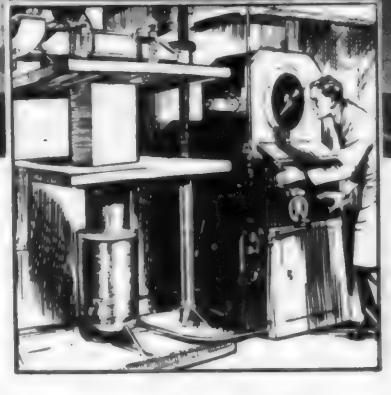
**Peter Harris and Company, Limited.** (527939.) 4, New London Street, London, E.C.3. To carry on business of manufacturers of and dealers in confectionery and foodstuffs. Nom. cap.: £2,000 in £1 shares. Dirs.: P. C. Harris and Mrs. K. M. Harris, Half Moon Platt, New Road, Windlesham, Surrey.

**G. and B. Preserves, Limited.** (528133.) Excelsior Works, St. Clements Street, Lower Ince, Wigan. To carry on business of manufacturers and producers of jams, preserves, canned and bottled fruits or foods. Nom. cap.: £2,000 in £1 shares. Dirs.: G. Langford Hall, Herwyn, Tan House Lane, Parbold, Nr. Wigan; F. R. Hall, Itton Garden, Itton Court, Nr. Chepstow, Mon; Mrs. M. Hall; Mrs. G. E. Hall, and C. A. Worswick.

**Urney Chocolates, Limited.** (528161.) Crompton House, Aldwych, London, W.C.2. Nom. cap.: £5,000 in £1 shares. Dirs.: H. T. Gallagher, Urney House, Tallaght, Co. Dublin, and R. Gallagher, Cypress Grove, Templeogue, Co. Dublin.

**Aquamix, Limited.** (528281.) 25, Birley Street, Blackpool. To carry on business of manufacturers of and dealers in refrigerators, air-conditioning, heating, cooking, and lighting equipment. Nom. cap.: £100 in £1 shares. Dirs.: A. W. Lambert, 22, Lathom Avenue, Morecambe, and M. Shaw, 31, Knowlys Avenue, Heysham.

*From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.*



*This apparatus is testing a "Fiberite" case to a pressure well above the highest it will normally have to resist in service.*

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Just a slight error of judgment — and down it falls. Will the case burst? Will the sides collapse? Will the contents be safe from the shock?

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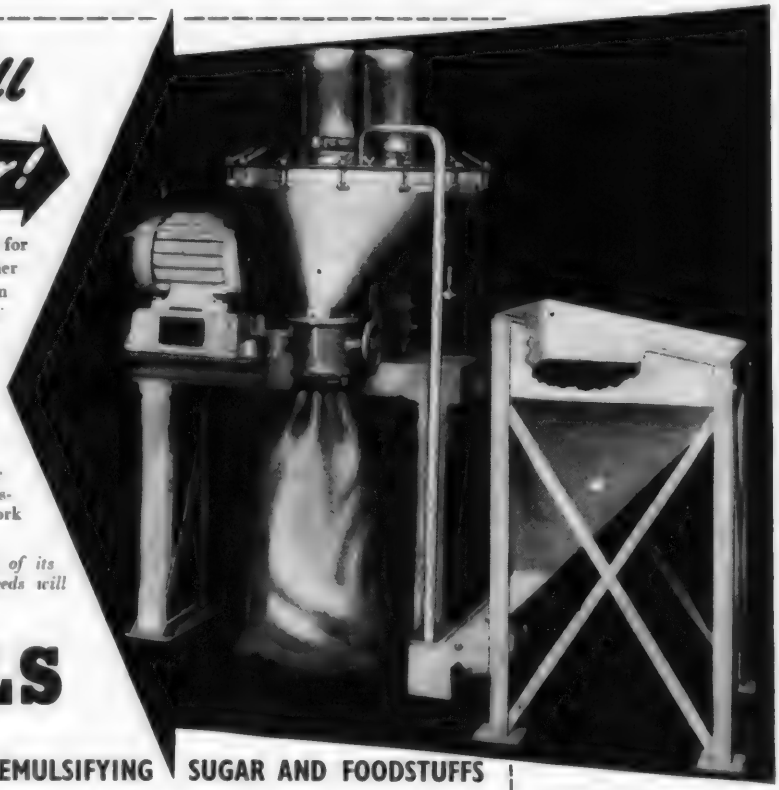
# NOW the Kek Mill grinds even finer!

The latest Kek Mill responds to repeated requests for a mill that would economically grind sugar and other food ingredients to finer mesh dimensions than have hitherto been customary. This finer grinding has been achieved without sacrificing to the slightest extent the speed of working and freedom from clogging for which Kek Mills are renowned.

### Suction Feed Effects Economy

This fine grinding mill is of course equipped with the Kek suction feed—so especially suitable for sugar and other free-flowing materials—which dispenses with the motor, starter and structural work required by a shaker feeder.

*Full particulars of the Kek Mill, with details of its icing sugar and pulverized sugar producing speeds will be sent on request.*



Note the compact assembly with feed hopper standing conveniently at floor level.

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*Available in 3 sizes*

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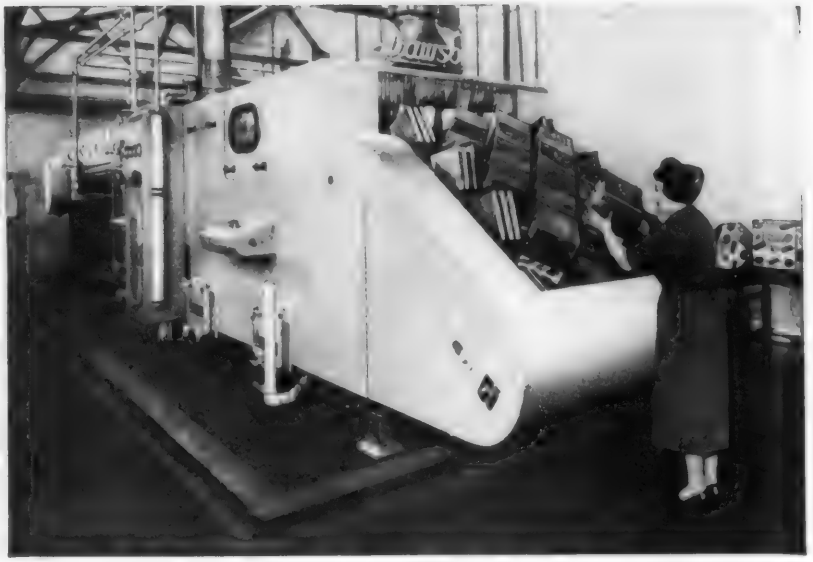

This is our BX 1 Biscuit Tin Washing Machine which has a capacity of 400 tins and lids per hour. Our range goes up to 2,000 tins and lids per hour. The machines are fitted as standard with continuous drying section or can be supplied separately as Washers and Dryers to suit your layout. The drying section can be arranged for steam or gas heating. These machines really do the work and we shall be glad to arrange a demonstration for you.

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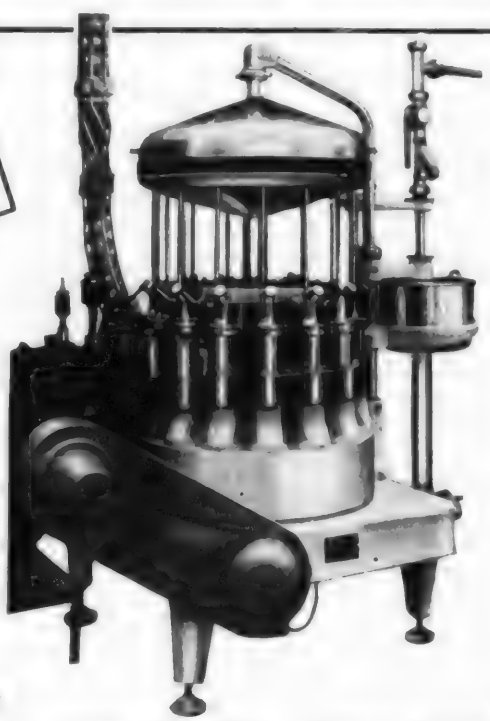
# See ALBRO for Fillers & Cappers

## A 15-head vacuum-operated can filler



ALBRO's 15-head vacuum-operated can filling machine for evaporated milk, soups, etc., is coupled direct with the Seamer.

It is simple and straight-forward in design, and valveless in construction, with straight feed pipes for rapid cleaning and sterilization. All parts in contact with the product are of bright, polished stainless steel.

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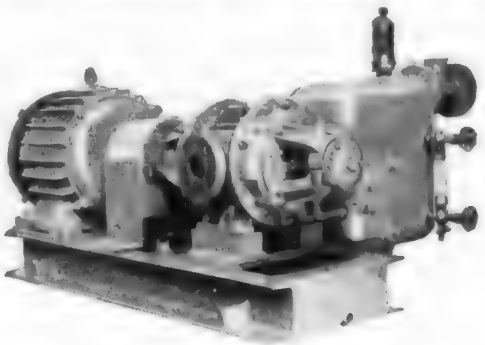

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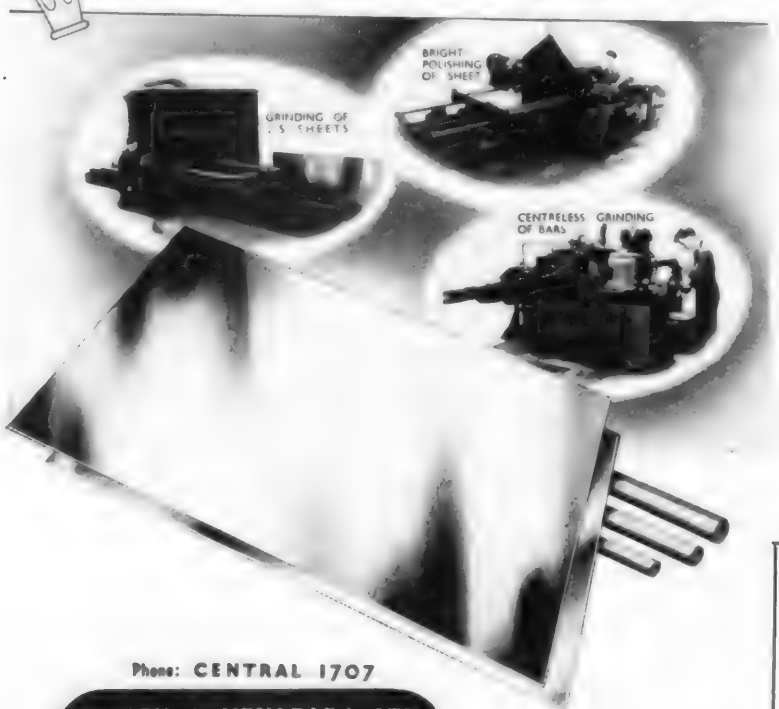


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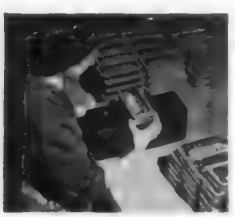

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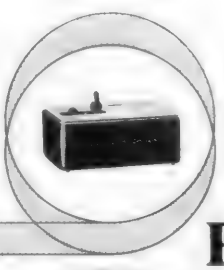
*Despatch Departments in many companies using Permacel Cellulose Self-Sealing Tape in a Flicx Sealer have raised packaging output by as much as 75%.*



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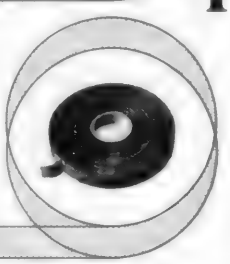

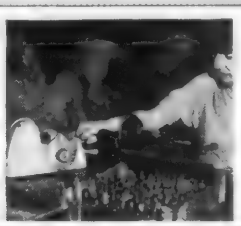

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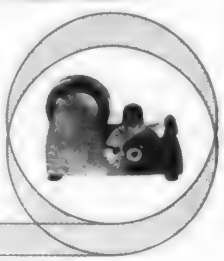

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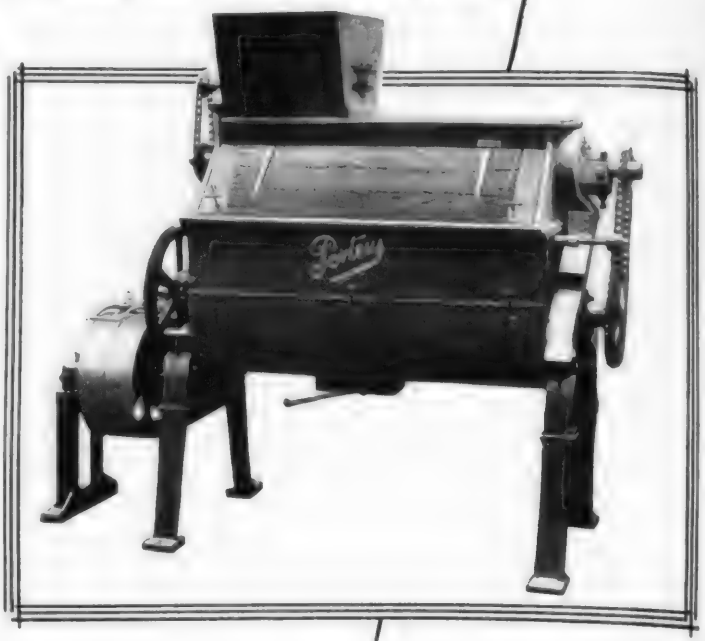

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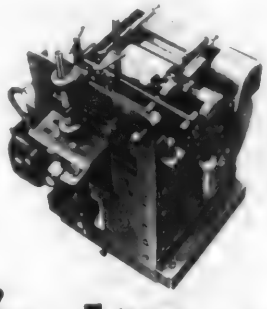

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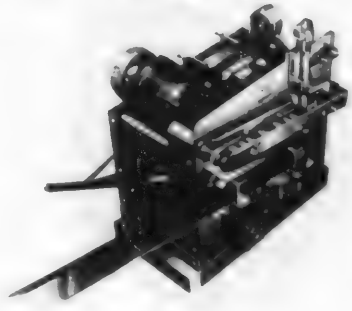

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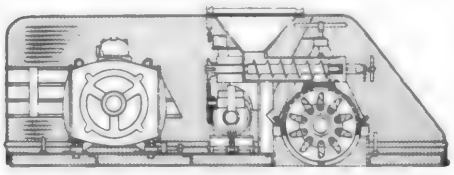

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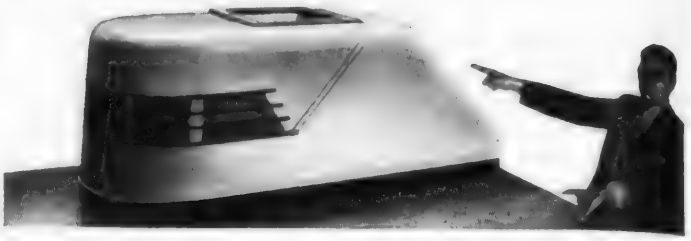

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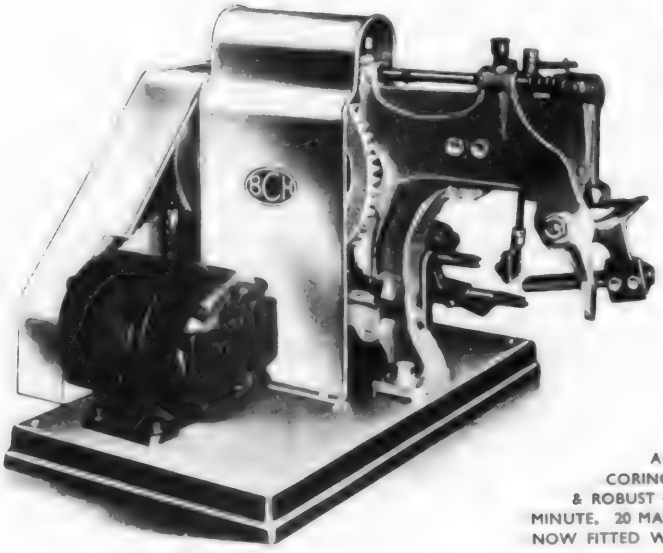

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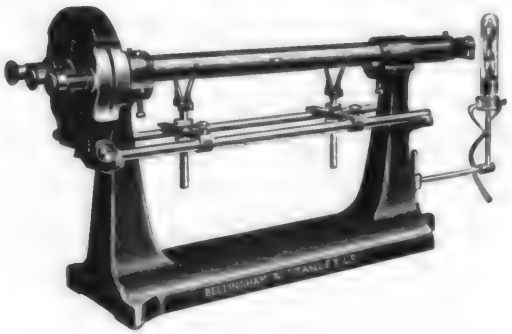

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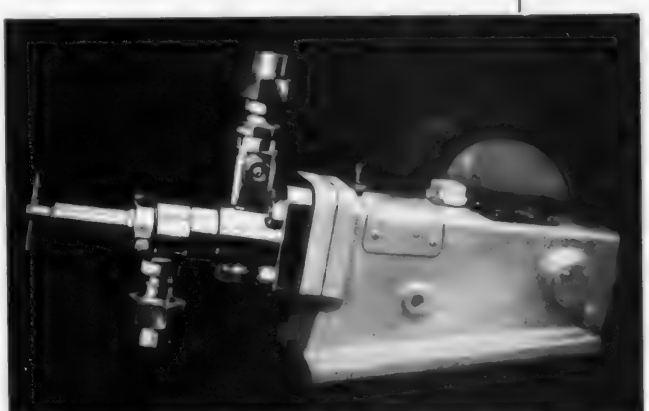

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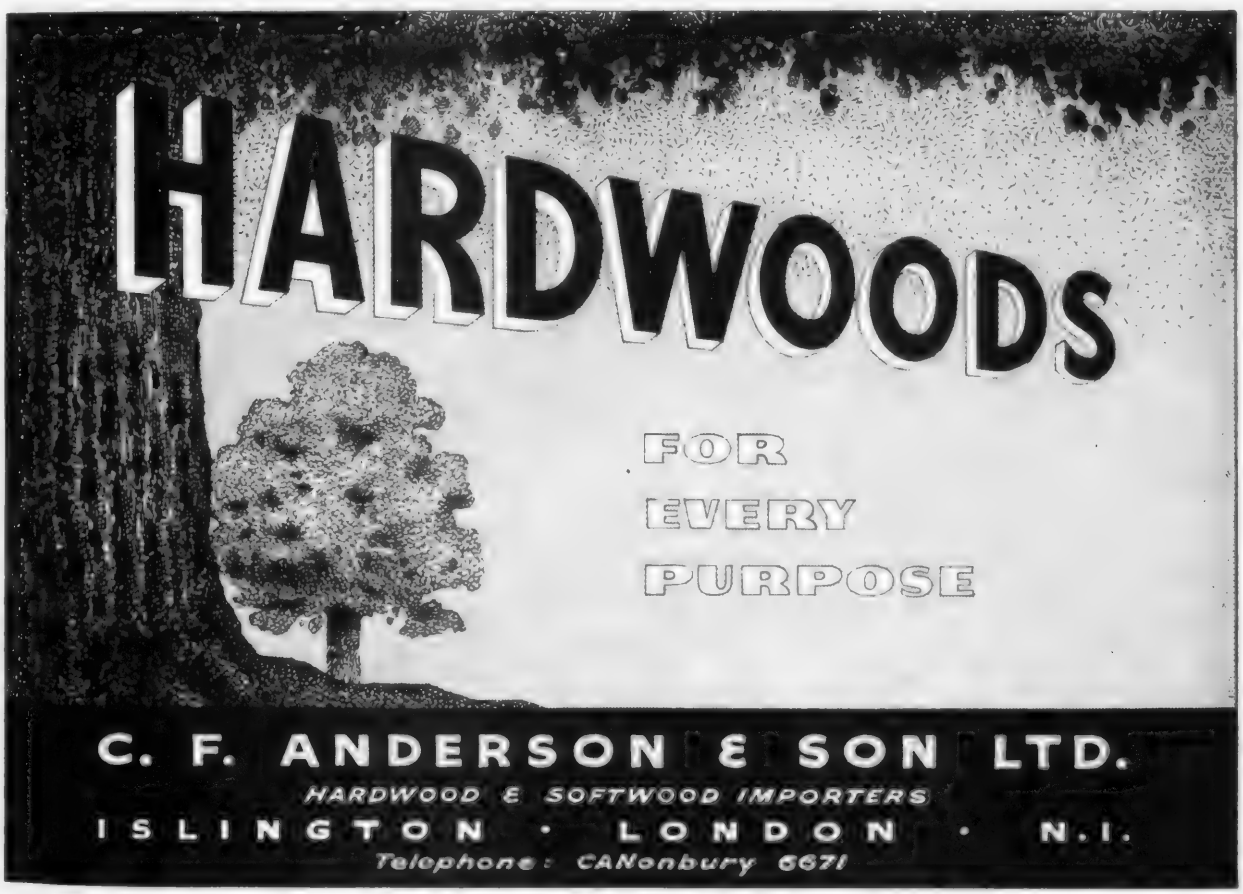

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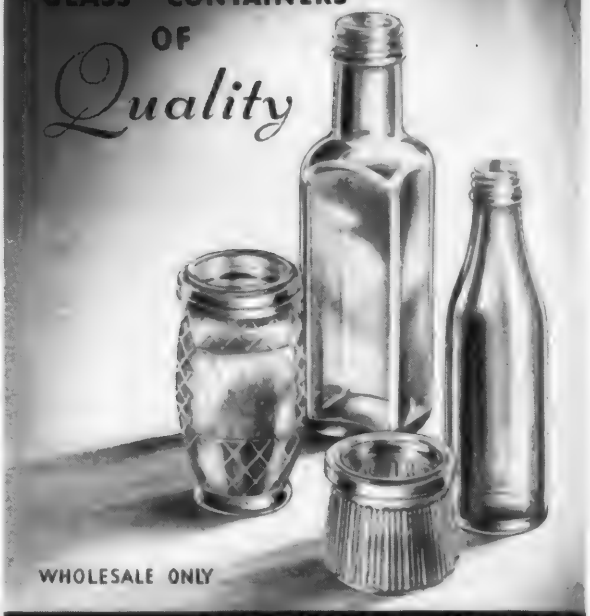

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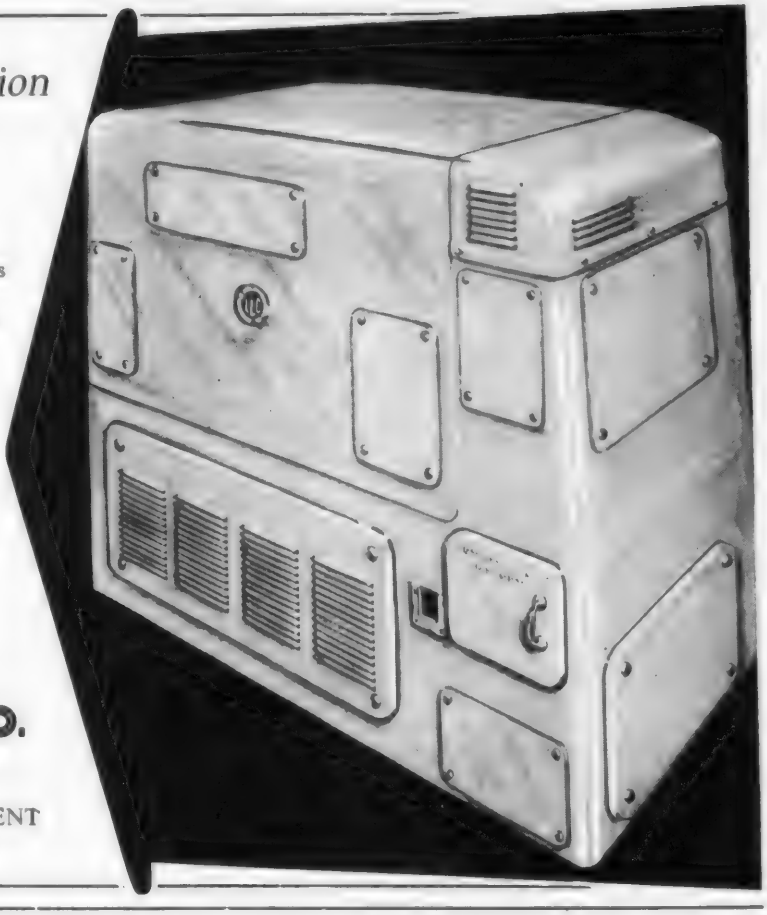

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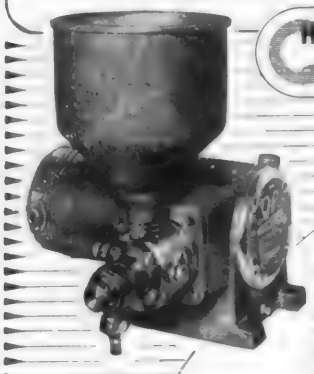

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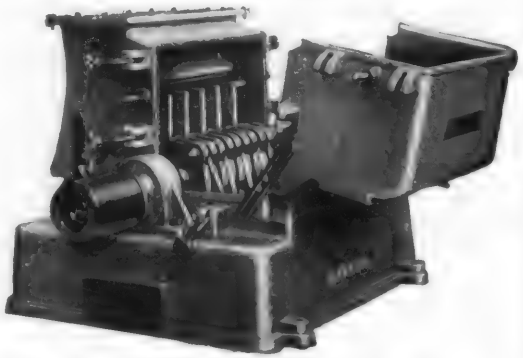

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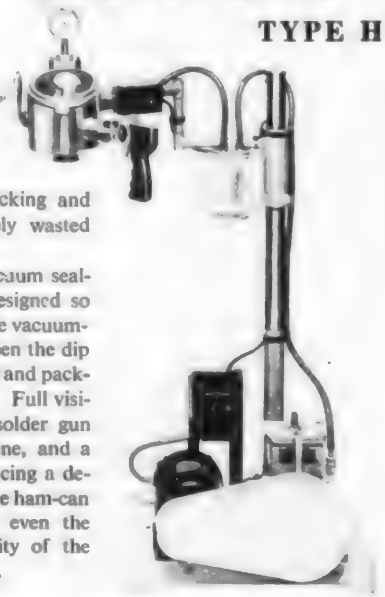

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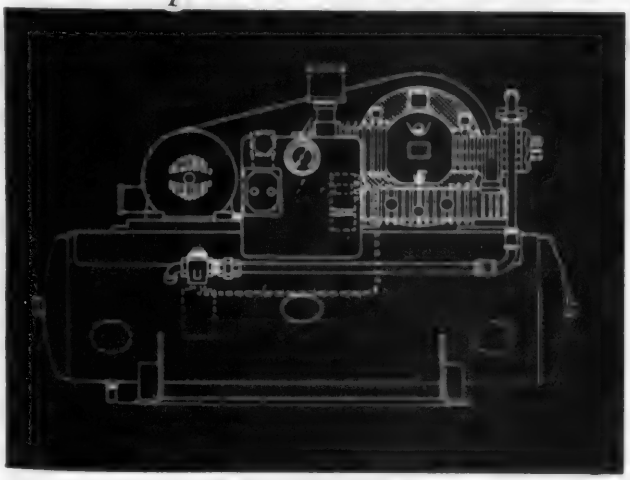

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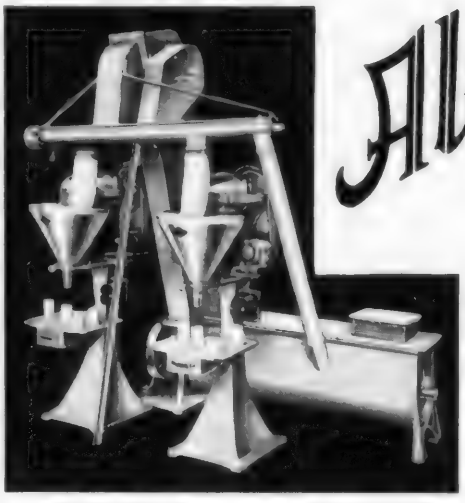

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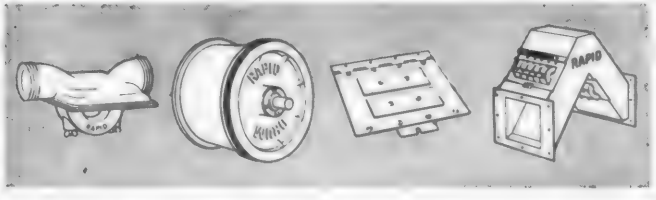


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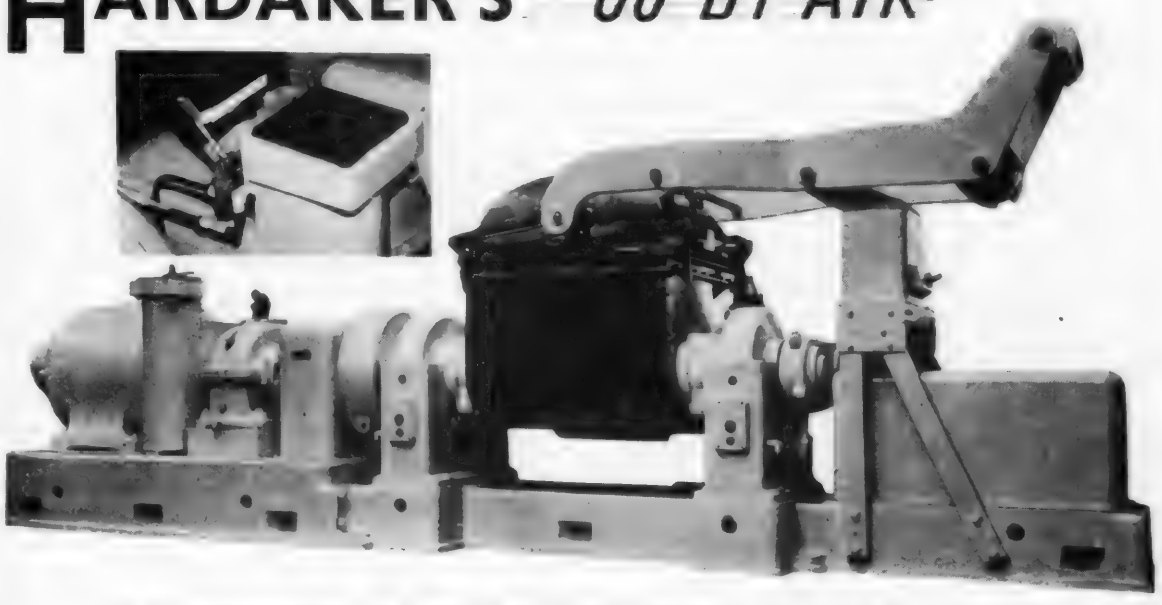

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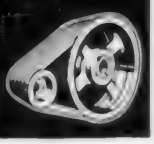

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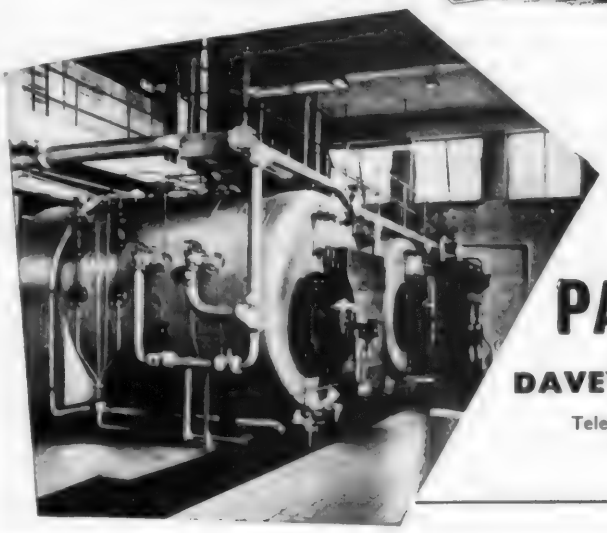

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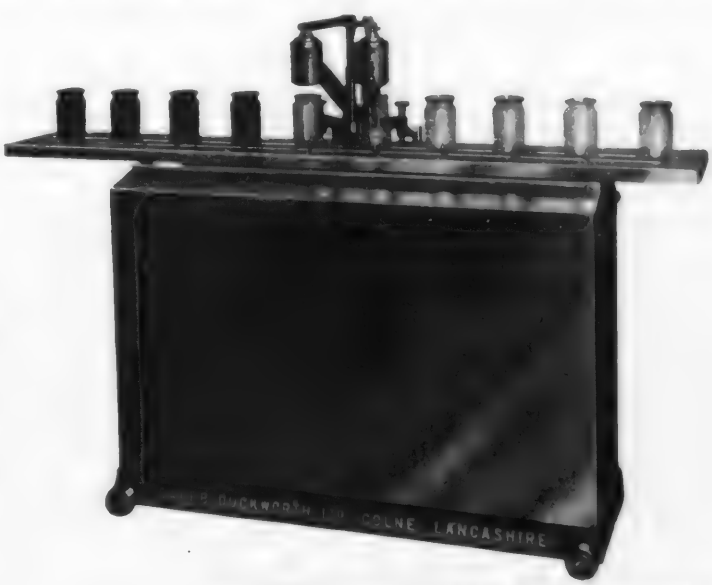


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New 32 oz. duck rubber covered Conveyor Belting $\frac{1}{16}$ in. top, $\frac{3}{32}$ in. bottom. This is new 6 and 4 ply oil resisting Conveyor Belting, off-white in colour specially manufactured to Specification 280 for handling foodstuffs of an oily nature.

36 in. wide, 6 ply, 2 lengths each 1225 ft. long.

36 in. wide, 4 ply, 1 length 750 ft. long, 1 length 180 ft. long.

24 in. wide, 4 ply, 2 lengths each 130 ft. long.

Full Details From:

**JAMES N. CONNELL, LIMITED**

**Phœnix & Clifton Works, Coatbridge, Scotland**

Tel.: Coatbridge 1121 (5 lines).

**TO MANUFACTURERS OF PRE-PACKED FOOD LINES SUITABLE FOR THE RETAIL OR CATERING TRADE**

Have you any dormant or slow selling goods that you wish to clear which are taking up valuable space? We are spot cash buyers for any quantity of the above.

*Send details to:*

**MR. R. J. HIBBINS**

**ANGEL WAREHOUSE CO. LIMITED**

**ISLINGTON GREEN, LONDON, N.1**

CAN. 3247 (10 lines)

*(Please mention this advertisement when replying.)*

## BUSINESS OPPORTUNITIES

**FOOD** Manufacturing Research Chemist has spare time and laboratory available. Any proposition considered of mutual benefit.—Box B4626.

**MANUFACTURER** of Chocolate Spread and Syrup owing to retiring age, would either amalgamate with another Food Concern or would sell outright manufacturing plant, process and trademark together with or without freehold property of 1,600 square feet area, including offices. Principals only.—Box B4625.

**PRINTING:** Clean, Clear Accurate Copies of Brochures, Advertising Circulars, Leaflets, Letter Headings and Hand Bills, printed any colour. Drawings, Plans and old manuscripts reproduced by Offset Lithography.—For a competitive quote send copy to: The Printing Department Five, Leonard Hill Limited, Stratford House, Eden Street, London, N.W.1.

**NORTHERN** Ireland Food Manufacturing and Bakers' Sundriesmen business for sale as a going concern. Good Manufacturing and storage accommodation with offices and laboratory. Plant and Equipment in good condition includes recently installed machinery for the manufacture of cream. Property available on long lease or may be purchased outright with Profit Rental attached. Good opportunity for those wishing to expand.—Box B4605.

**MOISTURE** Testing—with "Speedy" Moisture Tester, only 3 minutes. Accurate for most ingredients. No electricity, portable, can be used by unskilled labour. Price complete £24 10s. Send us sample of your ingredients and we will test and advise on simple testing technique; no obligation.—Write to Thomas Ashworth and Co. Ltd., Department FM/1, Basket Street, Burnley, Lancs.

**WELL-KNOWN** Company with headquarters in London and national sales organisation is now able to consider one good agency for the United Kingdom for a first-class food product for distribution through the grocery trade.—Full details to Box B4610.

**THE** Proprietors of British Patents Nos. 645864 and 645865 are prepared to sell the Patents or to license British manufacturers to work thereunder. They relate to Improved liquid egg products.—Address: Boult, Wade and Tennant, 112 Hatton Garden, London, E.C.1.

**OLD** Established firm of Food Manufacturers and Distributors expanding on a national basis are prepared to purchase similar businesses at present operating at a loss. Principals only of firms already engaged in, or having the facilities for the manufacture of sausages and open-pack meat products, with or without canning capacity, but with an existing sales organisation, are invited to send initial details which will be treated in strictest confidence.—Box B4573.

**PULVERISING,** Grinding, Mixing, Drying. We collect and deliver.—Crack Pulverising Mills Ltd., Plantation House, Mincing Lane, London, E.C.3. Mansion House 4406.

**DAMAGED** or redundant stocks of food, residues or by-products in large or small quantities required.—Send your offers to Rotunda Foods Co., London Office: 50/52, Blandford Street, W.1. Tel.: Welbeck 8465.

**£500,000**

available for the purchase of a

**FOOD MANUFACTURING BUSINESS**

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*Particulars in confidence to:*

**REGINALD TERRELL,**
MANAGING DIRECTOR,
**BUSINESS BROKERS LTD.,**
46, St. James's Place, London, S.W.1
(HYDE PARK 4720)

## BUSINESS OPPORTUNITIES

**SWEET** Making. Learn to make American candies and high-grade chocolates. Opportunities everywhere, distance no object. Successful clients operating in all parts of the world. Simplified method ideal for factories or retail shops. Mail course by American manufacturers with years of world-wide experience and knowledge. Small investment payable to our agent in your country with your own currency.—Write in first instance to: Liberty Chocolates and Supply Company, 1665, Beverly Boulevard, Los Angeles, 26, California, U.S.A. Established thirty-five years.

**FULL** Steam in five minutes with B. and A. Electrode Boilers, used by British industries for twenty years. No boilerhouse, no flue, no attendant needed. The most compact and convenient steam raisers available, can go beside machines using the steam.—Write for leaflet 125, Bastian and Allen Ltd., Ferndale Terrace, Harrow, Middlesex.

**WANTED:** Importers interested in Shelled Prawn, boiled as well as dry salted; Prawn Chutney; Mango Pulp in brine; Mango Chutney; Puppodums; Madras Curry Powder; fresh peeled and sliced Ginger preserved in brine and vinegar packed in teakwood barrels; and general produce from Southern India.—Apply to Eastern Produce Trading Co., P.O. Box 17, G.P.O., Madras.

**WELL-KNOWN** Scottish Pie Makers can offer attractive terms to Agents with own transport. Goods despatched to any part of the country by passenger train. Branded line, goods packed in cardboard cartons, each containing one dozen.—Trade inquiries to: V. C. Pies Ltd., Glasgow. Tel.: Maryhill 1048.

**DRIED VEGETABLES**
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**GROUND PAPRIKA**

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**AGRICULTURAL AND CHEMICAL PRODUCTS LTD.**
51 & 52 BARBICAN, LONDON, E.C.1
*Telephone: Monarch 6124-6 (3 lines)*

**MANUFACTURERS**

of proprietary lines wishing to process and or pack, etc., their products in the Republic of Ireland are invited to submit enquiries. Advertiser willing to make financial investment if desired, subject to investigation.—Box B4629.

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*SHEET METAL ENGINEERS*

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**WANTED,** second-hand Plant: Complete automatic ampouling plant; ointment or paste mill; ointment mixer, 80-quart Hobart or similar; sterilising oven; 4-6 c.f. Autoclave, gas, oil or electrically heated; homogeniser; hand-operated tube-filling machine.—Apply to Biorex Laboratories Ltd., 47-51, Exmouth Street, E.C.1.

**WANTED:** Knapp or Beth Heavy Duty Can Labelling Machine. High speed automatic suitable for range of cans 8 oz. to A2½ complete with motor and fittings.—Box B4606.

**VACUUM** Can Sealing Machine Filter Press, or similar.—Write Box 9894, c/o, 117, Piccadilly, London, W.1.

**WANTED:** One modern 1-3 lb. Southall and Smith Flour Weighing Machine.—H. H. and S. Budgett and Co. Ltd., Bristol.

**WANTED** Urgently: One Speedy Drained Peel Cutting Machine preferably by Wm. Brierley, Collier and Hartley Ltd.—Full particulars to Box B4614.

**REQUIRED:** Cream spreading Machine, Cooling Tunnel, and steam Sugar Boilers. State price, make, age, and where can be seen, together with fullest particulars.—Box B4619.

**GOOD** Condition, second-hand 5 gall. liquid Can Filling Machine required.—Details and price. Box B4622.

**WANTED**

**A.1 tall 16 oz. canning line, second-hand, comprising syruper, clincher, exhaust box, closer, cooker and cooler. Capacity approx. 60 to 70 cans per minute with maximum cook of 15 minutes. Reply J. O. Hedley, 140 Park Lane, London. W.1. or telephone Mayfair 5026.**

*All kinds of*
**GELATINES**

**CAKE AND GROUND**

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| ALMONDS | DES. COCONUT |
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**T. M. DUCHÉ & SONS**
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MANCHESTER · LONDON · GLASGOW

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**ONE** No. 11. Twin Prior Stoker complete with Electrical Gear, as manufactured by Prior Stokers Limited.—This equipment has never been used. Box B4607.

**NEARLY** New Fully Automatic Filler Weigher/Sealer by Automatic Weighing Machine Co., adjustable ¼ oz. to 4 oz. packets dry goods, with Feed Hopper and Motor. New 1949. Little used.—Frank Stacey and Co. Ltd., Vauxhall Street, Birmingham, 4.

**THREE** Copper Jam Boiling Pans, 40 gall. capacity suitable 100 lb. s.w.p. hand-tilting. New and unused.—Details from Box B4624.

**WHICKSTEED** Bread Buttering and Slicing Machine for sale in perfect working order.—For particulars or appointment to view: Crooks, 24, Lune Street, Preston, Lancashire.

## SECOND-HAND PLANT FOR SALE

# 600

TOTALLY ENCLOSED SQUIRREL CAGE MOTORS

**TOTALLY** enclosed squirrel cage motors available in quantity, rating 1/17½ h.p. Brook and Bull manufacture, all covered by our one year guarantee.

*Examples*:

Sixteen 1½ h.p. Brook Motors 400/440/3/50, tot. encl., surface-cooled, speed 1,420 r.p.m. one hour rated.

Twelve 5 h.p. Brook Motors, 400/440/3/50, tot. encl., surface-cooled, speed 1,430 r.m.p. one hour rated.

Six 5 h.p. Brook Motors, as above, but continuously rated.

Available for prompt despatch.

Similar machines are at the moment available at 960, 1,440 and 2,800 r.p.m. in other horse-powers.

PRESSURE VESSELS

Four vert. 13 ft. by 6 ft. 6 in. diam., welded, 90 lb. w.p.

Fifty vert. 13 ft. by 5 ft. 6 in. diam., 90 lb. w.p.

Twenty-nine horiz. 6 ft. 11 in. by 5 ft. 4 in. diam., riveted, 75 lb. w. p.

One horiz. 20 ft. 6 in. by 6 ft. diam., 100 lb. w.p.

One vert. 9 ft. 6 in. by 42 in. diam., 150 lb. w.p.

Two horiz. 40 ft. by 52 in. diam., 1,000 lb. w.p.

Six vert. 6 ft. by 36 in. diam., 100 lb. w.p.

One horiz. 11 ft. 6 in. by 32 in. diam., 150 lb. w.p.

Four air bottles 16 ft. 7 in. by 25½ in. diam. 1,000 w.p.

One air bottle 8 ft. by 20 in. diam., 750 lb. w.p.

One air bottle 11 ft. by 18 in. diam., 450 lb. w.p.

**GEORGE COHEN**
**SONS & CO. LTD.**
**WOOD LANE, LONDON W.12**
**Tel.: Shepherds Bush 2070**
**& STANNINGLEY, Nr. LEEDS**
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**THREE** Cabinet Type electric Tray Driers for sale. 35, 70 and 140 sq. ft. areas. 60 enamel trays, 40 galvanised and 10 mesh, All 32 in. by 16 in. by 1½ in. deep. Bargains for quick sale.—Tay Valley Co., Errol, Perthshire.

**SURPLUS** Plant for sale ex-factory, includes Bramijk's Sugar mill Chocolate Malanguers Refiner, Cooling Tables, Dried Fruit Cleaning Machine, Dough Mixers, Pumps, Motors, Scales, Jelly Cutting Machine, etc.—Write for complete Price List to Famor Food Products Ltd., Santry, Co. Dublin.

**FOR** Sale: Complete 2 h.p. Sterne Air Cooled Refrigeration Unit with automatic control, 3-phase, 50 cycles, A.C. motors, switch gear, etc.—Offer to Box B4618.

**KELVIN GILLESPIE** 2½ sack capacity Dough Mixer with 5 pans; Baker Perkins Moulding Machine also splitter, capacity 6 sacks per hour, and Southall and Smith 0 to 4 lb. automatic gravity feed Weighing Machine.—Box B4620.

**TWO** Autopack Weighing and Packing Machines up to 2 lb. £75 each. One Pulper with five stainless steel strainer sleeves, £125. One Silkenburg H.T.S.T. £50. One Apothecary Scales and Weights, £10. One brand new Creamery Package Multifo H.T.S.T., £550. One second-hand Creamery Package Multiflo H.T.S.T., £350. One 300-lb. Bartleet Chocolate Kettle, £150. Homogenisers: one 400 g.p.h. Cherry Burrel, £400; one 100 g.p.h Cherry Burrell, £275; one 200 g.p.h. Creamery Package, £300; one 100 g.p.h. Creamery Package, £250. Stainless steel steam heated Vats, with motorized agitators by Creamery Package and Cherry Burrel, 100 gall. £225; 200 gall. £325. Stainless steel Refrigerated Vats by Creamery Package and Cherry Burrell, 200 gall. £325; 100 gall. £200. Large stocks of confectionery, refrigeration and ice cream plant. Details on request.—Alfred's Ices (1954) Ltd., 3/5, Hall Place, London, W.2. Tel.: PADdington 6619/6610.

**Powell & Co., 'Drum Master' Works, Burry Port, Carms**

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## SECOND-HAND PLANT FOR SALE

**VACUUM** Can Seamers for sale. Ashworth and Parker, auto feed. Capacity 3⅞ in. diam. by 4½ in. high, motor driven.—Photo., etc., F. J. Edwards Ltd., 359, Euston Road, London, N.W.1.

**BAKER** Perkins removable pan Viennara Kneading Machines, half sack and one sack sizes. In excellent condition.—Particulars from Messrs. Lloyd Rakusen and Sons Ltd., Meanwood Road, Leeds, 7.

**TWO** stainless steel Tipping Pan Batch Mixers, each 40 gall., bronze geared beaters. Two-head vacuum Bottle Fillers by Roberts. "Perplex" Grinding Mill, No. 2 size. 80-quart Mixer by Melvin, four speeds. Tablet Press by Colton, geared, 2 in. die socket.—Welding, Son and Co. (Vauxhall) Ltd., Saxone Buildings, Tarleton Street, Liverpool, 1.

**BENHIL** automatic butter or margarine Packing Machine, complete with motor and starter. Perfect working order.—Sorensen's, Drake Street, Manchester 15. Tel.: CENtral 1353/4. 'Grams: Rahbek.

The Strongest Vanilla Flavour
**VANOLEUM**
**1 oz. (2/6) makes a pint of essence**
**4 ozs. 8/6. ½ lb. 16/6. 1 lb. 32/-**
*For further details apply:*
**ARTHUR WHITTAKER & CO. LTD.**
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## MISCELLANEOUS WANTS

**FOOD** Manufacturers wish to contact firms in all parts of the country who could undertake the immediate manufacture and distribution on a regional basis of a range of meat products which are to be nationally advertised.—Box B4574.

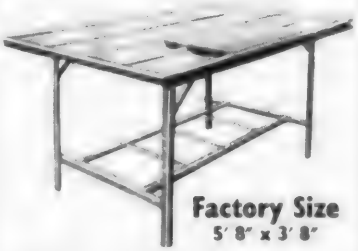
**AN** established organization wishes to purchase outright a company manufacturing quality food products. One offering possibilities of expansion preferred, but consideration would be given to a company suffering from lack of capital—Box B4581.

**CUSTARD** Powder, Dessert Powder and Blancmange. Any quantity of dormant or slow-selling stocks of these goods wanted, either bulk or pre-packed in packets.—Full details to Box B4551.

**MEDICAL** bottles; tablet bottles; jars; bottle closures, bakelite and metal purchased. Best prices paid.—Samples and full details in first instance to Noel Davold and Co., 9, Laurence Pountney Lane, Cannon Street, London, E.C.4. Tel.: MANsion House 3951-2.

## MISCELLANEOUS SALES

## Stainless Steel Tables



**Factory Size**
**5' 8" x 3' 8"**

The table tops have the improved inverted flutes running lengthwise; no waste materials can collect or clog; easier for cleaning down. They have 1½" lip all round; have two outlet holes; re-inforced on underside for heavy duty. Finish of metal—"Bright-gloss." Guaranteed "CORROSION AND ACID Resisting" (Firth's quality, as used for the culturing of Penicillin). Weight of tops ¼ cwt. Mounted on mild steel underframe enamelled White or Blue.

Price including hardwood cutting board—£19/10/0 complete.

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UNDERFRAMES MADE SECTIONAL FOR THE EXPORT TRADE.

**THOS. HOGG**
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**Phone: MOS. 3072.**

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**NEW** Stirrers and Mixers, ¼ h.p., 1,500 or 420 r.p.m. Totally-enclosed or flameproof for 400 volts, 3 phase, 50 cycles supply. Ex stock. —Fluid Equipment Co. Ltd., 83, Seafield Road, London, N.11.

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**BROADWAY** all-steel Storage, Shelving, Racking, Bin and Bench units, Clothes Lockers, Tool Cabinets, Tool Boxes, Component Trays, Paraffin Washing Trays, Stacking Pans for parts, Easysweep Trucks for clearing floors, Stillages, etc.—Write for brochure, Broadway Equipment Ltd., 194, Finchley Road, London, N.W.3. Tel.: Hampstead 7476.

## STAINLESS STEEL VESSELS

**CAPACITY 3 GALLONS** **Height 12"**

Full aperture cross section 8" × 10".

20 gauge Stainless steel.

Unused ex M.O.S.

Complete with lids.

**PRICES**

singly **58/-** each

dozens **55/-** each

fifties **50/-** each

*Carriage 2/- each.*

*Immediate Despatch.*

Handle swivels flat. Easily cleaned, easily carried.

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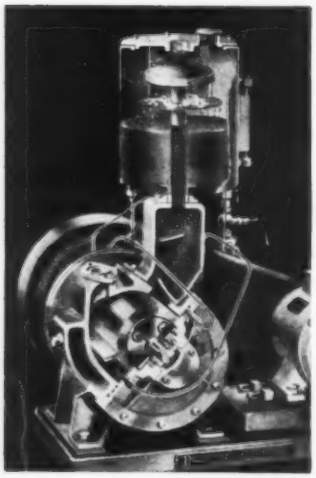

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**The new can with the hermetic closure and perfect "re-seal"**

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Ideal for
COCOA
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## Metal Box *'Know-how'* does count!

THE removal of packaging restrictions allows this entirely new type of can to be supplied freely for the first time—and Metal Box capacity for quantity manufacture means that it is available at an economic price. The Collar Can has advantages for both manufacturer and consumer. It gives hermetic sealing. It is opened easily with the key provided. When opened the equivalent of a neat hinged-lid gives an efficient and convenient reseal. High quality surface decoration, printed direct on to the metal, can add sales and advertising value.

The Collar Can is precision made and designed for high speed filling and closing operations. It is ideally suited for most types of powders, solids and granulated products that need a hermetic seal to preserve freshness and flavour. An ingenious can proving that in container design and production Metal Box "Know-How" does count!

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